

ARBORETUM BULLETIN

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Only choice No. 1 Washington stock will be shown and sold during our fall shrub sale, which will open in September. From all over the Northwest we are re-assembling the most popular and sought after flowering and ornamental shrubs for your selection.

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You'll find many of the best known named varieties. All grafted stock.

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Evergreen.

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Fruit Trees***
Bearing size.



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The Arboretum Bulletin



The Value of the Arboretum Foundation

By O. B. THORGRIMSON

THE FOUNDATION affords a place for public spirited citizens interested in horticulture and plant life generally to render a real service to this state in establishing and helping to maintain an arboretum where trees, shrubs and other plants, including not only those native to this area but from a large part of the world, can be successfully grown. It is generally recognized by plant men who have studied the subject that this particular area is one of the best in the entire world, equalled only by Western Ireland and Southern England, as a place for growing the greatest variety of valuable trees and shrubs.

The Foundation was the instrument whereby the University of Washington Arboretum was established. It interested the University authorities and city officials in an Arboretum and was helpful in securing the setting aside of Washington Park for that purpose. It also raised the initial money necessary to commence the project. Its members early recognized the necessity of having adequate plans prepared at the outset, and by securing a thorough survey and detailed plans from Olmsted Brothers, it laid the foundation for our present Arboretum. Thousands of dollars were raised by the Foundation and used in securing plant material and in planting and maintaining the same, and large donations of trees and shrubs were secured through the efforts of its members. It also interested the 1943 State Legislature in making an appropriation for Arboretum purposes, and I think it can be safely said that the Arboretum now is so well established that it can be successfully maintained, and its plantings gradually ex-

panded. While many people may feel that in these times it does not come under the head of a necessity, yet the war will end sometime and we must plan for the future, and in years to come I believe that not only the people of this state, but those living in other parts of the United States will appreciate the value of our Arboretum.

While as an agency of the University we expect further appropriations from the legislature for its maintenance, yet in order to be properly developed outside money will be needed, and the Foundation is the proper instrument to provide an endowment fund to be devoted to the maintenance of the Arboretum. In addition, everything that we can do in interesting people generally in the Arboretum will be of value. When properly established, the various departments of the University will find the Arboretum of value in certain types of research work. It will be of value as a place where people interested in the different varieties of plant life can observe such plants in a growing condition. It will also be a means of stimulating the interest of our people in proper plantings for their own homes.

The Arboretum will be of distinct value in a monetary way. People from outside of the State will visit its fine collection of plant life and when the fact is generally known that our climate is such that trees and shrubs from all sections of the world can be successfully grown here, it will bring people to this state. Think what the Kew Gardens has meant to England. It is known throughout the world as the site of the finest collection of trees, shrubs and other plants which are indigenous to the temperate zone. Even our own Arnold Arboretum, located as it is in the cold and bleak climate of Massachusetts, has attracted

world-wide attention and is of value to the whole nation as a place where plant life can be studied under growing conditions.

Even though the Arboretum has now been established, and the legislature has appreciated its value to the extent of making appropriations for its maintenance, yet there is a distinct need for the Foundation to continue its efforts. Unless it does so, there is danger that the interest of our citizens in the Arboretum will diminish, and it will not be properly developed and maintained. I hope, therefore, we all will be able to secure more members, and through our membership encourage all plant lovers to aid in securing money for Arboretum purposes and to interest people generally in visiting the Arboretum and thus assist in making its value known throughout the nation.

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Minutes of the Annual Meeting June 4, 1943

THE ANNUAL meeting of the Arboretum Foundation was held on June 4, 1943, in the Auditorium of the Women's University Club.

The meeting was called to order at 8:30 by Mr. Thorgrimson, president.

Mr. Thorgrimson thanked the Washington State Federation of Garden Clubs and Mrs. Nehammer as chairman of the decorations committee, for the lovely flower decorations.

Mr. Thorgrimson introduced Mr. Philip D. Macbride, chairman of the University of Washington regents, who gave the introductory address. Mr. Macbride stated that the progress of the Arboretum was largely due to the devoted and untiring efforts of the men and women members of the Arboretum Foundation, and with the continuation of this spirit in cooperation with the University, a truly great Arboretum would evolve.

The minutes of the last annual meeting were read by Mrs. Schibig, secretary. Minutes approved.

Mr. Thorgrimson stated that the Arboretum is under the control of the University, operating through the Arboretum Committee, which determines general policies which are carried out by Dr. Hanley, director of the Arboretum. Mr. Thorgrimson further stated that to give the Arboretum Foundation representation on the University Arboretum Com-

mittee, Dr. Sieg, President of the University, had appointed him a member of that committee.

Mr. Thorgrimson read his president's report in which he briefly mentioned the various standing committees and the work accomplished by them as follows:

Membership Committee, Mrs. Henry Field, chairman. This committee has done valuable work in securing new members, with the result that two new members were secured for every one who has been dropped.

Bulletin Committee, Mrs. Roy Page Ballard, chairman. This committee has formulated plans to publish quarterly bulletins which will replace the smaller monthly issues. The editorial policy will include current and future activities at the Arboretum, practical gardening and growing information and general articles including items on advanced gardening and scientific work by outstanding horticulturists and botanists all over the world.

Arboretum Unit Committee, Mrs. Carl Ballard, chairman. This committee secured new members through formation of units, obtained donations of money and labor and worked in the greenhouses and nursery.

Plant Disposal Committee, Mr. A. P. Fredrickson, chairman. This committee carried on the work of the disposition of surplus plant material. Mr. Frederickson was largely responsible for the completion of the lath house, which project also received generous contributions of material from Col. W. B. Greeley.

Special Projects Committee, Mrs. Arthur J. Krauss, chairman. Principal projects during the past year were the apple drive, the Holiday store and the John Grant book sale. The apple drive with Mrs. Krauss as chairman netted \$1,815; the Holiday Store with Mrs. Geo. T. Williams as chairman, \$340, and the book sale around \$200.

Acquisitions Committee, Mrs. Don Palmer, chairman. This committee was helpful in securing new plants and in raising money to purchase various materials and supplies. The members of this committee also worked at the Arboretum on various plant collections.

Publicity Committee, Mr. G. Wright Arnold and Mrs. James Wylie, co-chairman. This committee secured publicity for the Arboretum and the various activities of the Foundation throughout the state.

Speakers Committee, Mrs. J. Swift Baker, chairman. During the past year this committee filled many speaking engagements at various garden clubs and civic organizations.

Finance Committee, Mr. Perry B. Truax, chairman. This committee not only functioned in all financial matters pertaining to the Foundation, but Mr. Truax was largely responsible for the \$41,700 appropriated for the biennium, from the state legislature. The Washington State Federation of Garden Clubs, under the leadership of Mrs. Harry L. Stinson is also particularly to be commended for their cooperation in this connection.

Ways and Means Committee, Donald G. Eggerman, chairman. This committee was helpful in obtaining new memberships in the larger classifications.

Certain proposed changes of the by-laws were read by Mr. Thorgrimson regarding the appointment of the nominating committee.

A report of the nominating committee was read by Mr. Thorgrimson. A complete list of the Board for the coming year was read which included the following new members: E. A. Anderson, Mrs. Harold Thompson and Mr. Chas. Larrabee of Bellingham.

A motion was made and seconded that nominations be closed and that the secretary be instructed to cast a unanimous ballot. Carried.

Miss Margaret McKenny showed colored slides and lectured on wild flowers.

There being no further business the meeting was adjourned.

Respectfully submitted,
IDA SCHIBIG, *Secretary*

Officers

O. B. Thorgrimson.....	President
A. P. Fredrickson.....	Vice-President
Mrs. Alexander McEwan.....	Vice-President
Mrs. Arthur J. Krauss	Vice-President
G. Wright Arnold	Vice-President
Aubrey L. White	Vice-President
Mrs. Roy P. Ballard.....	Vice-President
Herbert L. Collier.....	Treasurer
Mrs. Walter J. Schibig.....	Secretary

DIRECTORS
Seattle

E. A. Anderson, G. Wright Arnold, Mrs. J. Swift Baker, Mrs. Carl Ballard, Mrs. Roy P. Ballard, Cebert Baillargeon, Mrs. Lawrence Bogle, Mrs. Frederick A. Bunge, M. M. Chism, Herbert L. Collier, O. J. C. Dutton, Donald G. Eggerman, Mrs. Henry C. Field, Mrs. Stuart Frazier, A. P. Fredrickson, Mrs. Edward Garrett, Donald G. Graham, Mrs. Donald G. Graham, W. B. Greeley, Mrs. Fred Remington Greene, Mrs. Loren Grinstead, Mrs. Langdon C. Henry, Mrs.

Alexander B. Hepler, Herbert G. Ihrig, Maurice B. Jackson, Mrs. Arthur J. Krauss, Mrs. Philip D. Macbride, Mrs. Alexander McEwan, Miss Annie McFee, Walter A. Moore, Mrs. Don H. Palmer, Reginald H. Parsons, E. L. Reber, Mrs. Walter J. Schibig, Mrs. C. W. Stimson, Mrs. Harold B. Thompson, O. B. Thorgrimson, P. B. Truax, Mrs. George T. Williams, Charles S. Wills, and Mrs. James W. Wylie.

Spokane

Joel E. Ferris, Mrs. Ben Kizer, Dean Charles E. McAllister, R. L. Rutter, E. A. Shadle, and Aubrey L. White.

Bellingham

Mrs. W. H. Abbott, Charles Larrabee, and Mrs. John Pierce.

Tacoma

Mrs. A. S. Black, Mrs. Metcalf Fogg, and Mrs. Corydon Wagner.

Aberdeen

Mrs. Werner Rupp.
Washington State Federation Representative
Mrs. Harry L. Stinson, Mrs. Walton W. Howard.

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Standing Committees of the Arboretum Foundation—1943-1944

Acquisitions	Mrs. Don H. Palmer
Membership	Mrs. Philip Macbride
Unit Membership	Mrs. Carl Ballard
Publicity	G. Wright Arnold and Mrs. James W. Wylie—Co-chairmen
Ways and Means	E. A. Anderson
Plant Disposal and Committee Work	Mrs. George T. Williams
Bulletin	Mrs. Roy P. Ballard
Finance	Mr. P. B. Truax
Speakers	Mrs. J. Swift Baker

Arboretum Notes

THE PHYSICAL condition of the Arboretum tract has improved measurably since April 1, 1943, when the first biennial appropriation from state funds became available. The general appearance of substantial, critical areas has changed for the better and many plants of necessity neglected during the sparse years of 1941 and 1942, are now getting the attention which they need and deserve.

Our labor force has been materially augmented; we now have seven men and one woman hired on a permanent basis, and five additional men and one woman working temporarily on week-ends. This force has been kept busy during the whole summer on general maintenance and cleaning-up work along Lake Washington Boulevard and the upper road, in Rhododendron Glen, Azalea Way, and Woodland Garden, and at both the Madison Street and Montlake entrances. The happy results are apparent to even our most casual visitors.

*The Importance of a Pacific N. W.
Arboretum*

A Viewpoint from the Atlantic Seaboard

By DONALD WYMAN*

THE PAST winter was a very cold one over the entire United States. Reports from Scottsville, Texas; Lisle, Illinois; Boston, Massachusetts; or Seattle, Washington, all are the same—coldest winter in years. However, the degree of cold and its seriousness is gauged differently in different places. I cannot refrain from smiling when a friend in Seattle writes that some rhododendrons in Seattle experienced 8° above zero! Here in New England our rhododendrons experienced a temperature of about 20° below zero, and that was not as bad as it was in the winter of 1933-34 when temperatures in the rhododendron collection went 30° below zero. My point is that, first and foremost, the University of Washington Arboretum is unusually fortunate in being situated in a climate which is not severe.

It is the winter cold which kills plant tissues. Yes, many other factors contribute. Such things as insufficient rainfall in the autumn, poor soil conditions, very hot and dry summer conditions, all help, but low temperatures do most of the killing, as was proved this last winter in the Arnold Arboretum. We have had more injury to woody plants than at any time since the winter of 1933-34. There was plenty of rainfall last autumn, no high winds during the winter to cause excessive drying, and other factors were normal, so the chief cause for the killing experienced during the past winter was the low temperature. In the Arnold Arboretum there were at least six days of below zero weather, and the injury is directly traceable to this cause.

Any arboretum can have a large number of "borderline" plants—plants which are undoubtedly tender but for which may be found some definite spot where they might prove hardy. For instance, we can grow the crepe myrtle here very well in the summer, for the growing conditions are just right. But winters like the last one kill even the hardiest strains.

Seattle is particularly blessed by being near the warm Pacific Ocean. A glance at any har-

diness map shows a strip along the Pacific Coast from southern California up to Canada which has climate milder than any place on the Atlantic Coast north of Norfolk, Virginia. This means that in Seattle can be grown almost everything that grows on the northeast Atlantic Coast plus a great deal of the plant material which grows in the southeastern United States as well. It would appear to an interested eastern observer that more kinds of plants can be grown in Seattle than at any place on the Atlantic Coast, and for this reason the University of Washington Arboretum is indeed fortunate.

There are many things yet to be learned about a large number of our ornamental plants. For instance, take the lilacs as an example. These are represented in several good collections in the eastern United States and in the Midwest. During the past year a survey was conducted to determine which lilacs were being grown in the United States and Canada, and which ones seemed to do best. The University of Washington rated eighteen varieties at the time, but undoubtedly many others grow there. The idea was to obtain a consensus of opinion about these plants and make a list of recommended varieties—varieties which were performing well everywhere they were grown. The list was assimilated, published, and has since proved most popular.

However, one of the interesting results of this study was the fact that a variety might perform differently when grown in different soils. Only a careful survey would bring this fact out for in most cases such a discrepancy, particularly if demonstrated by variations in the color of the flowers, would be termed the result of mixing varietal names. However, we have noticed one particular plant here in the Arnold Arboretum of the variety "Congo" which has been gradually producing lighter and lighter colored flowers each year. They used to be a deep purple. Now they are a very light blue! The reason why this happens is unknown yet, but the fact is irrevocably established. The University of Washington Arboretum can lend considerable help with this problem if it does nothing else but report carefully on its lilacs for a few years, giving the rest of us the benefit of knowing how certain varieties perform when grown in Seattle. All people interested in plants welcome such in-

*Horticulturist, Arnold Arboretum, Harvard University.

formation, particularly when it comes from a part of the country where little information has been available in the past.

Then comes the matter of hardiness, and because of its unique situation the University of Washington Arboretum could contribute a great deal to what little we know of this problem. Seattle is sufficiently farther north from Golden Gate Park, so that there is a decided value to any hardiness study which can be made there. This, combined with information from Golden Gate Park and other California arboreta, and compared with similar data taken in the Missouri Botanical Garden, the Morton Arboretum, and some of the botanical gardens and arboreta on the Atlantic seaboard, should give us a much better picture of the hardiness of certain plants, than could be obtained without any information from the northwest corner of the United States. Though various horticulturists have known what grows well in this area, nevertheless a systematic study of plant hardiness there would fill in a disconcerting blind spot in our knowledge to date.

The University of Washington Arboretum has a golden opportunity in adding to our information about growing plants. Of course it is proving helpful to local home owners and those interested in the development of the Northwest. But it has a far greater contribution to make to national horticulture. Its peculiar situation will enable it to grow many hundreds of plants in addition to those now being grown by the present major botanical gardens and arboreta of this country which are necessarily limited by a severe climate. If it can continue to forge ahead, planting every species and variety which will grow in that climate, making studies and comparisons in the plant population, publishing the results of its research, and disseminating general information to the public, it can easily become one of the leading arboreta in North America.

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One of the most interesting natives among the plants in our nursery is the cut-leaved alder, a variety of *Alnus rubra*. The three fine specimens which we have were made available to us by Mr. Oliver Mathews of Oregon who transported them, tied to the top of his car, all the way up here in early 1942.

The Value of the Arboretum to Eastern Washington

By PAUL D. BROWN

MY FIRST knowledge of the existence of the University of Washington Arboretum came the latter part of 1938 when I stood in the office of Mr. A. L. White, garden editor of the Spokane Spokesman-Review. On the wall in his office is a large plan of the Arboretum. I took time to study it and was fascinated by the great possibilities of such a project. I noticed the planning of different plant families and visualized the ultimate goal and objectives of such an undertaking. I wished then that I might have just a little part in it, and it was only the voice of Mr. White, letting me know that he was ready to talk to me, that awakened me from my day dream.

About two years later while visiting with Mr. White, he told me of receiving some plants from the Arboretum for trial in Spokane. At that time I was superintendent of grounds at Eastern Washington College of Education. Immediately I caught a vision of an experimental plot in Cheney and the addition of many new varieties of trees and shrubs to the campus collections. I took it up with President R. E. Tieje and he, too, was very enthusiastic. Through Mr. White we got in touch with Dr. John Hanley, director of the Arboretum, and explained the situation to him. The following spring we received from the Arboretum a shipment of evergreens including sixteen varieties that were not found on the college campus. Some of these seemed, at first, to be borderline trees. However, all but one species came through last winter, which was unusually hard. I not only got a thrill out of this experience, but also felt that I was contributing just a little to the betterment of horticulture in Eastern Washington, and I am sure that Dr. Hanley felt that he, too, was helping the Arboretum to function in a state-wide work.

Comparatively few people of Eastern Washington realize that we have an Arboretum in connection with the university. Of these few there are perhaps some who do not give it any thought. However, there are hundreds of garden enthusiasts and scores of garden clubs who are anxious to increase their lists

of plants and to learn how to grow more successfully the ones they have. Although some are able to experiment, the majority of plant lovers would like a report from some authoritative source before investing in new plants. But somehow the range of mountains that divides the state seems to have more than just a climatic effect upon our people. We realize that there is a great difference in climate, and because of that we feel that those living on the opposite side do not understand our problems. This, however, is not altogether true. There is a constant interchange of facts and findings between the University and Washington State College at Pullman. When I asked Dr. Hanley for that shipment of plants I had confidence in his judgment and knew that he would not send me something that he was sure would not be suitable for Eastern Washington. His years of experience in the East and Middle West have taught him to appreciate the climate of our state.

Plant lovers everywhere are interested in new varieties, and someone must be the first to try them in each locality. While one person may fail with his particular type of soil or location, another may succeed with the same plant. Many trees, shrubs, and flowers are now being grown in Eastern Washington that were a few years ago considered not hardy or were unknown. Many plants are growing in alkaline or neutral soils that once were considered able to grow only in acid soils. Other gardeners are learning how to maintain an acid condition for such plants as hardy azaleas. Most nurserymen and florists are anxious to introduce new plants to their customers. Many of their experiments in this direction are carried on at great sacrifice to themselves. The fact that they are in touch with new introductions, of course, gives them a little advantage over the layman, yet there are many laymen who induce their nurseryman to try out certain species and it is these lay plant lovers with whom we of the Arboretum would like to cooperate. Much of the feeling between Eastern and Western Washington is mere prejudice. It is true that as far as plant life is concerned we are favored with the most wonderful climate in the world. However, the Inland Empire, the Walla Walla, Yakima, Wenatchee, and Okanogan valleys, all have wonderful climates and can grow many beautiful flowers as well as fruits. The

Arboretum, in its exchange of plants with similar institutions around the world will be introducing thousands of new trees, shrubs, and plants down through the years, and through these introductions will be able to contribute much to different areas of Eastern Washington. Many of these will be far more at home on the east side of the mountains, as they will come from parts of the world having similar soil and climatic conditions. Plants from China, Chile, Russia and other far points will find their way into the Arboretum in the future as they have in the past. Little packets of seed received from some little known botanical garden today will eventually be beautiful trees or shrubs in the Arboretum.

As a state institution we want to serve the whole state with information that is the result of our work. The only way that we can accomplish this is to get in touch with residents and institutions of Eastern Washington who are interested and will let the Arboretum know either through personal contact or correspondence. Upon checking the long list of visitors, who have at some time left their names and addresses in the registry at the Arboretum, we find that just about every section of the state has been represented. In nearly every case these visitors are interested in some particular kind of tree or shrub. For example, a man from Yakima has been trying to get English holly to grow in his city. He visited the Arboretum and was surprised to find that there were so many different kinds of holly. We will be glad to help him with his hobby and any results he may have will be of interest to us. It may take many years of experimenting with soils and exposures before any concrete results will be obtained.

We send out a hearty invitation to any individual, garden club, institution, or commercial grower anywhere in the state to visit the Arboretum and see the wonderful collection of trees and shrubs, get acquainted with the staff, and let us help you with your problems.

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Many of the Western dogwoods on the Arboretum tract are being killed by *Phytophthora cactorum*, the fungus which is attacking both madronas and dogwoods throughout the Seattle area.

Fruits For The Home Garden in Western Washington

By E. L. OVERHOLSER, D. J. CROWLEY,
AND D. F. ALLMENDINGER¹

THE increase in population of Western Washington in connection with the war effort, and the present desirability of each home producing as much of the family food supply as feasible, has stimulated interest in home fruit gardens. For further points of view and directions in growing fruits in the home garden, the reader is referred to the other article appearing in this issue of the ARBORETUM BULLETIN, viz., "Tree Fruits for Home Gardener in Eastern Washington," and "Small Fruits for the Home Garden in Eastern Washington" which will appear in the December issue. By means of footnotes and elsewhere in the text, the reader is referred to other published information giving cultural directions and variety descriptions, which are available for the asking. The home fruit gardener should be prepared to control diseases and insects as necessary or disappointments may result. Furthermore, the amateur fruit grower should make every effort to follow recommended practices of pruning and other cultural operations. Maximum production of high quality fruit can be obtained only if soil fertility and moisture are satisfactorily maintained and if proper cultural practices are followed.

*Small Fruits*²

*Strawberries.*³ Most of the production in Western Washington has been from the Marshall variety which is in demand at good prices for freezing and preserving purposes. The Marshall, however, is showing a marked decline in production because of its susceptibility to the virus disease known as "yellows." On the other hand it seems to offer considerable resistance to another serious and complex strawberry trouble called "root rots." The Brightmore (U.S.D.A. 1084) is now a promising new strawberry variety. It is productive, attractive, and the berries are firm

fleshed and well adapted to preserving. The Rockhill can also be suggested (see article pertaining to Eastern Washington). This is an ever-bearing variety that makes very few runners and it is propagated by dividing the old crowns of "mother" plants. Best production is obtained from newly set plants and it may be advisable to set out new plants each year.

Red Raspberries—The new varieties, Washington and Tahoma (C. D. Schwartze, Wash. Agr. Exp. Sta. Pop. Bul. 153, March, 1938.) are winter hardy, high yielding, resistant to certain diseases, and adapted to commercial marketing, as well as to the home garden.

Tahoma is an early market variety of bright color and attractive appearance. It is superior to Marlboro, appears to have good shipping qualities, and will ripen the crop somewhat earlier in the season than the Washington.

The last-named (Washington) is superior to the popular Cuthbert and is adapted to both freezing and canning though it appears susceptible to the anthracnose disease, which however, has not been a serious disease in Western Washington up to the present time. Its fruit is ready for picking after the Tahoma. Washington can be more highly recommended for the home garden than Tahoma. It is more productive and better adapted to canning and to locker freezing than the Tahoma.

The Lloyd George is a large fruited, high quality, tart-flavored variety that would be desirable for home gardens except that the plants are often short-lived. The cause of this trouble has not been determined but it has become sufficiently serious to suggest the abandonment of Lloyd George for either home gardens or commercial plantings in Western Washington.

Both the Tahoma and Washington escape the red raspberry mosaic of Western Washington and are immune to the western yellow rust disease.

The Taylor variety is vigorous and productive and, while it ripens too late for most profitable commercial markets, it should be a good late variety for home gardens. It is not outstanding for commercial canning or freezing.

The Cuthbert, while producing an excellent high quality fruit, is largely going out of commercial production because it is very susceptible to winter injury in Western Washington.

1. Head, Division of Horticulture; Specialist, Cranberry-Blueberry Laboratory, and Assistant Horticulturist, Western Wash. Exp. Sta. and Wash. Agr. Exp. Sta., respectively.

2. Most growing-season small fruits in Western Washington are benefited by irrigation. Hence the reader is referred to "Irrigation of Vegetables and Berries in the Home Garden," by L. J. Smith, State Col. of Wash. Ext. Circ. No. 60:1-4. June, 1943.

3. See Ext. Bul. 246, "Strawberry Growing in Washington."

Blackberry and Dewberry — Boysenberry, Thornless Oregon Evergreen, and Thornless Loganberry (1939 West. Wash. Exp. Sta. Rpt.) are promising in Western Washington.

The Evergreen blackberry is hardy and productive but it would be commercially more profitable if it ripened its fruit 10 to 14 days earlier. Unfortunately it is more susceptible to crown gall than are red raspberries.

The Logan, Young, Olympic, and Boysen are not as hardy as the Evergreen but the Boysen appears to be the most hardy of these four. The berries, with the exception of Logan, are in good demand for commercial freezing.

The group, including the varieties Boysen, Young, Olympic, Jumbo, Nectar and Franklin D., appear to be very similar in fruit and plant characteristics. The Nectar appears to be almost identical with the Boysen, but occasionally its flavor seems slightly richer and sweeter. The Young, Olympic and Jumbo varieties are also quite similar, but they differ from the Boysen-Nectar group in earlier ripening, slightly less acid flavor, lighter color of foliage and in being slightly less hardy. Franklin D. is similar to Youngberry and inferior to Boysen in size, quality and productivity.

The types of bush blackberries, called Alfred and Blowers, appear worthy of trial in home fruit gardens.

The Cascade and Pacific varieties are very high in quality. They are new hybrid forms recently introduced by the U. S. Bureau of Plant Industry and the Oregon Agricultural Experiment Station. They have inherited the high flavor and small seeds of the western dewberry (*Rubus vitifolius*) and the good size and yield of the Loganberry. The Cascade tends to be slightly larger and more richly flavored than the Pacific and is especially recommended for home fruit gardens. The berries are soft for shipment but excellent for freezing, dessert, and culinary purposes.

Thornlessness of blackberries and dewberries is desirable when it can be obtained without sacrifice of fruit quality. The Thornless Evergreen and Thornless Logan, therefore, can be recommended, but Thornless Boysen, Thornless Young and Acme Thornless are inferior to their thorny types.

*Grapes*⁴—The principal grape variety now grown in Western Washington is Campbell Early (Island Belle), which is marketed chiefly through wineries.

A few other varieties such as Concord, Delaware, and Diamond are cultivated for home use and a limited local market (West. Wash. Exp. Sta. Rpt. 1939). Only those grapes that ripen their fruits early to early mid-season can be depended upon to mature each year if planted from Tacoma northward.

Several grapes that appear worthy of trial in home fruit gardens are: Fredonia, an early blue colored variety, and several early greenish-white colored sorts, the Portland, Ontario, and Seneca, all of which ripen sufficiently early in the fall for planting in all counties of Western Washington. Seneca is high in eating quality and flavor.

Sheridan (blue) and Golden Muscat (white) mature just after Campbell's Early (Island Belle) and, therefore, should be planted only in the southern counties or the warmer localities around Puget Sound.

*Blueberries*⁵—The essentials for blueberry production are a good acid soil with a high percentage of humus, plenty of moisture during the growing season, and sufficient drainage so that the roots are not submerged or even partly submerged during the winter. If planted on low ground, the water table should be kept at least two feet below the surface during the growing season.

Blueberries are not as particular as cranberries as to the soil in which they grow. They will thrive on low ground or on a hillside, but the largest berries are produced on bushes grown in peat or in a mixture of peat and sand where much moisture is available. They do not enjoy stiff clay soils, but where a few plants are desired for home use, sufficient peat, sawdust or decayed wood may be incorporated to modify such a soil sufficiently for blueberry garden culture. It may be still better in a heavy clay soil to dig a hole about

4. For cultural directions see "Grape Culture in Irrigated Eastern Washington," by W. J. Clore and Wm. D. Bridgman, *Arboretum Bulletin* 6: 18-21 and 31-35. March, 1943.

5. For a further discussion of blueberry growing, the reader is referred to "Observations and Experiments with Blueberries in Western Washington," by D. J. Crowley, *Wash. Agr. Exp. Sta. Bul. No.* 276:1-20. 1933.

two feet in diameter for each plant, and to put peat or decayed wood or sawdust into it. Plants set out in this way, which have been under observation for several years, are now growing and producing an average crop of berries.

For a home garden, as well as for commercial planting, varieties that do well in most sections of Western Washington are: Jersey, Pemberton, Dixi, Concord, Rubel, and Pioneer. Cabot is also a very desirable form with a high dessert quality, but it is less hardy in some parts of the state. For the Puyallup Valley, June, Rubel, Concord, and Jersey have been satisfactory and ripen their fruit in the order listed.

The fruits are picked as they become dark blue in color and may be harvested over a period of several weeks. They are delicious eaten fresh, with sugar and cream, or in pies.

Two-year-old plants are probably the most economical to buy when starting a planting as older plants often make little growth for a year or two after being transplanted.

Plants for home gardens may be set four feet apart each way. Blueberries are low growing and are well adapted to the back yard or even as ornamental bushes. The annual application of an acid peat mulch and small amounts of nitrogen fertilizers, together with irrigation or applications of water as needed are helpful. Where the soil tends to be alkaline in reaction or where the water used in irrigation tends to be high in salts giving an alkaline reaction (as in Eastern Washington) the annual application on the soil surface about the plants in early winter of a level teaspoonful of aluminum sulfate may be beneficial.

Plants need little pruning the first two years after being set out, although it may be advisable to cut back the tops at planting time. The best fruit is produced on young, vigorous shoots and when these show signs of under-productiveness, they should be removed. Hence, annual pruning will largely consist of the removal of growth over three or four years old. Little trouble has been experienced with insects and diseases. The cultivated blueberry should, therefore, be a valuable addition to the home garden.

*Cranberries*⁶—Cranberry growing has such specialized and definite requirements that

growing in the home garden is not recommended. There are, of course, a few farm homes that no doubt may have the necessary climatic and soil requirements.

Cranberries grow on an acid, peat, or muck soil. Such locations may be recognized by the type of the existing vegetation found thereon. The presence of the native wild cranberry (*Vaccinium oxycoccus*) and sweet gale or *Myrica gale* is a good indication of suitable cultural conditions. For a discussion of the best varieties, see the article entitled "The Fruit Industry in Washington", in this issue of the ARBORETUM BULLETIN.

Tree Fruits

*Peaches*⁷ — Pacific Gold resembles the Rochester. Attesting its popularity and desirability is the fact that approximately 400 acres of the variety have been planted in Western Washington. Its season of harvest is limited to about 10 days.

Varieties tending to have blossoms fairly resistant to late spring frosts include the Rochester, Pacific Gold, South Haven and Veteran. The last-named (Veteran) is promising as a freestone canning variety, but has a tendency to develop weak crotches in the main branches of the tree. It is well adapted to both home and commercial canning and is actually superior to Pacific Gold for this purpose. It ripens about two weeks later than the Rochester peach. The earliest to ripen is Mayflower. Sunbeam is another good type which possesses a very desirable quality in that its yellow flesh does not discolor by oxidation upon exposure to the atmosphere. It appears to be outstanding in fruit color but only fair in flavor when frozen, and the trees tend to be lacking in productivity. Elberta and J. H. Hale do well in Clark County

Apples—Promising new varieties are Milton and Early McIntosh. Lodi, which appears superior to Yellow Transparent in Eastern Washington, is very susceptible to anthrac-

6. For information pertaining to cranberry culture, the reader is referred to "The Cultivated Cranberry in Washington," by D. J. Crowley, Wash. Agr. Exp. Sta. Bul. No. 349:1-46. 1937.

7. For further directions in peach growing, the reader is referred to "Peach Growing in Washington," by E. L. Overholser, A. L. Kenworthy and R. M. Bullock. Wash. Agr. Exp. Sta. Pop. Bul. No. 162:1-32 1941.

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Tree Fruits For The Home Gardener In Eastern Washington

By E. L. OVERHOLSER, F. L. OVERLEY, AND
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THE importance of the commercial tree fruit industry of Eastern Washington is well recognized. The amateur fruit grower or home fruit gardener should do nothing that in any way might jeopardize this industry, which is so important economically to the state. For example, no individual should thoughtlessly yield to the temptation of glowing descriptions and colored plates of new varieties and order nursery fruit trees from quarantined areas east of the Mississippi River. This might result in the introduction of a pest or disease that would be most serious to certain of our commercial fruit crops. The Washington State Department of Agriculture at Olympia is maintaining 17 state plant quarantines in an effort to prevent the introduction of dangerous fruit insects and diseases in Washington.

New fruit varieties originating in the eastern part of the United States can be obtained through the cooperation of the U.S.D.A., Division of Plant Exploration and Introduction. In their efforts to be helpful they have had the cooperation of fruit breeders both in this country and Canada, and in response to public demands, they obtain new varieties, pass them through their quarantine houses at Glenn Dale, Maryland, and one season's observation at Chico, California. Propagation wood is then offered to horticulturists in all of the Pacific Coast states. There is no safe short cut in time embodying good quarantine practices.

Furthermore, the planting of fruit trees by the amateur fruit grower, especially in commercial fruit growing districts, involves a definite responsibility. It is important to control diseases and insects. Otherwise backyard fruit trees may serve as sources of infection or infestation, as for example, codling

moth with apples. Fruits needing careful spraying to control serious pests are not well adapted to the home fruit garden. Unless the home fruit gardener is prepared to conduct a spray program or to employ individuals equipped and trained to control the insects and diseases, home production of many fruits may be disappointing.

The amateur fruit grower produces fruit as an avocation, for healthful pleasure, for home use, and to add to the diet and food supply. Notwithstanding the available supply of fruit grown commercially, many families do not have a sufficiently varied and adequate fruit diet.

Kinds and Varieties

In most of Central Washington, especially where water can be applied during the growing season, and late spring frosts do not occur, cherries, plums, prunes, peaches, nectarines, apricots and certain nuts can be grown.

The varieties to plant will, to considerable extent, vary with the preferences of the individual. The home garden fruit grower emphasizes season of ripening, and especially high flavor, or excellent eating quality, particularly as they appeal to himself or his family. He is willing to sacrifice productiveness and capacity of a variety to withstand market handling, and even color and appearance in order to grow a special variety that tastes exceptionally good. Those listed are designed to give a ripening sequence, provide for cross-pollination, and produce high quality fruit for fresh use and processing. It, however, is the privilege of the amateur to grow any variety he prefers or wishes to try, if properly obtainable. Some of the varieties suggested in the lists given subsequently may not be readily obtainable from the nurserymen of the state at present, but they are named in the hope that the demand may justify their becoming available for the amateur in future years.

Cherries—(a) The Manchu cherry (*Prunus tomentosa*), is a small, early blooming, attractive, ornamental tree, hardy and very frost resistant. It produces small, tart cherries desirable for culinary purposes, especially jellies.

(b) Duke cherries (*Prunus effusa*) are considered by some to be a race of hybrids between *P. avium* x *P. Mahaleb*, that produce sprightly flavored fruits:

1. Head, Division of Horticulture; Assoc. Horticulturist (and Supt. Tree Fruit Branch Exp. Station), and Assistant Horticulturist (and Horticulturist, Irrigation Branch Exp. Station), Washington Agricultural Experiment Station, respectively.

1. Early May is earliest to ripen and is a true dwarf.

2. May Duke is medium early ripening and is good for culinary purposes.

3. Late Duke is late in season of ripening and satisfactory for culinary, canning, and freezing purposes.

(c) Sour pie cherries (*Prunus cerasus*) are self-fertile and do not require cross pollination. The small, roundish-headed, bushy-topped trees have definite ornamental value as well as being the source of the sour or pie cherries of commerce. They are hardy throughout Eastern Washington:

1. Early Richmond is the leading early sour cherry, for pies, canning, or freezing.

2. Montomorency is widely adapted, and mid-season in time of ripening.

3. English Morello is the standard late sour cherry, which hangs on the tree long after it is fully ripe.

(d) Sweet cherries (*Prunus avium*), produce tall trees with strong, central leaders. They are self-sterile and provision must be made for cross-pollination. Sweet cherries may occasionally be winter-killed in Eastern Washington.

1. Early Purple matures its fruit very early and its dark, reddish-purple flesh is of very good quality, making it desirable for the home garden.

2. Black Hawk matures its fruit early and its high quality for eating (out of hand) makes it excellent for home planting.

3. Napoleon (Royal Anne), is a yellow cherry with bright red mottled overlay, mid-season in ripening, suitable for canning and maraschino cherries.

4. Deacon is comparable to Bing except the fruit ripens a few days earlier and is not quite as large; it is less firm of flesh and lighter in color. It is necessary as a pollinizer for the Bing, Lambert, and Napoleon, which are self- and inter-fertile.

5. Bing is a late mid-season, very large, red-black, high quality cherry for dessert, canning and freezing.

6. Lambert is a late, firm, sweet, pleasant flavored, reddish black cherry, considered very good for canning and freezing.

*Peaches*²—Most peaches are self-fertile and the only varieties grown to any extent that are self-sterile are J. H. Hale, Halberta, Candoka,

Mikado, and Chinese Cling. Peaches succeed in Central Washington, but losses may occur from killing of buds and wood by low winter temperatures in Eastern Washington, except in the more protected regions. Several varieties of each season of ripening are named from which a choice can be made from the list below:

1. Marigold is a yellow-fleshed, semi-clingstone, early ripening (early July), productive, and has good quality for table use.

2. Arp, a semi-cling, is an early ripening (mid-July), productive, good quality peach with light yellow flesh, which is desirable for table use.

3. Oriole, a freestone, when fully ripe, is approximately one week later in ripening than is Marigold, and is outstanding because of its season and excellent quality.

4. Golden Jubilee, a freestone, medium season in time of ripening (late July), is attractive with good dessert and canning qualities, being the earliest peach desirable for this latter purpose.

5. July Elberta, a freestone, is a medium season, (early August), attractive, yellow-fleshed peach, having very good dessert and canning qualities.

6. Halehaven, a freestone, is medium-season (early August), in time of ripening, with large, very attractively colored, yellow-fleshed fruit of good dessert and canning qualities.

7. Valiant is a freestone, mid-season (nearly mid-August) and has a highly colored skin, with yellow flesh sometimes streaked with red.

8. Redelberta (freestone), an Elberta bud-sport, is a late mid-season (mid-August), peach of medium size with a highly colored skin and yellow flesh, desirable for canning.

9. Early Elberta is freestone, late mid-season (after mid-August), having yellow fleshed fruit of good canning quality.

10. Gold Medal is freestone, late in season (late August), with yellow flesh, attractive, and is considered excellent for dessert and canning.

2. For further cultural directions pertaining to peaches, see "Peach Growing in Washington," by E. L. Overholser, A. L. Kenworthy and R. M. Bullock. Wash. Agr. Exp. Sta. Pop. Bul. No. 162:1-32. 1941; for more complete descriptions of peach varieties see "Preliminary Notes Concerning Peach Varieties in Washington," by W. J. Clore, A. L. Kenworthy, E. L. Overholser and R. M. Bullock. Mimeo. 1941.

11. J. H. Hale is freestone, late in season (late August), very attractive, excellent for dessert, canning, or freezing, but should not be planted alone because of self-sterile habits.

12. Elberta is freestone, late in season (last of August); a standard variety for home canning.

13. Rio-Oso-Gem is freestone, late in season (last of August); a highly colored peach of very good dessert and freezing qualities. It is very susceptible to mildew and, therefore, is adapted to the drier areas, rather than the more humid regions of the state.

14. Krummel is freestone, fall ripening (late September), and especially desirable for table use.

15. Salwey is freestone, the latest to ripen of the peaches listed herewith, and should not be planted in regions of early fall frost or of short growing seasons.

Nectarines—The nectarine has an excellent flavor and the skin of the fruit lacks the pubescence which is objectionable upon many peach varieties when eaten fresh. Thus they are a fine type of fruit for the home garden, excellent to eat, and they make a very desirable product when frozen. The trees and buds are about as hardy as peaches. Two varieties can be suggested: (1) Humboldt, a large, yellow-fleshed fruit having very good quality; and (2) Blood Fleshed, a medium-sized, white-fleshed fruit of good quality, ripening late in the season.

Plums—There are two species of plums grown in Washington, viz., the European plum (*Prunus domestica*) and the Japanese plum (*Prunus salicina*).

European varieties of plums (freestone) that can be suggested, listed in approximate order of ripening, are: (a) Tragedy, a juicy, tender, sweet, dessert plum; (b) Sugar, a sweet plum, having lots of sugar, very good for dessert or drying; (c) Italian, a tart plum, desirable for cooking, canning and drying; (d) Imperial Epineuse, excellent in quality when harvested well matured, and good for eating out of hand and for drying; and (e) President, a large, blue-skinned plum with greenish colored flesh, good for canning and culinary use. The European plums are more winter hardy than the Japanese and hence are better adapted to planting in the

eastern part of the state than the Japanese varieties.

Japanese varieties of plums (usually clingstone) that will give a succession of ripening fruits over a number of weeks are the following:

(1) Beauty, a red skinned variety ripening fairly early and of good flavor;

(2) Santa Rosa, a red plum, ripening medium early and good for dessert and culinary purposes;

(3) Delicious, a red, nearly freestone, plum, medium in season of ripening and excellent for dessert and cooking;

(4) Duarte, a red plum, medium late in season, for dessert and canning purposes;

(5) Elephant Heart, a very large, late, red plum of excellent flavor and quality for eating fresh and very good for canning.

The Japanese varieties succeed better in the valleys of Central Washington than in the eastern part of the state or at the higher elevations, since the low winter temperatures may kill the fruit buds, or late spring frosts may kill the blossoms. The Japanese varieties tend to be self-sterile, and at least two varieties should be planted.

Apricots—The apricot is a delicious fruit and does not require cross-pollination (except Riland variety), but because of its early blooming habit it can be expected to fruit only in frost-free regions. To give early and late ripening apricots, two varieties are suggested: (1) Riland, early, and (2) Tilton, late, is popular for dessert, canning and freezing.

Quinces—The quince fruit is not edible in fresh condition, but conserves or preserves are made from them. The trees are relatively susceptible to fire blight and low winter temperatures may occasionally result in killing back of the tops. The varieties are: (1) Pineapple and (2) Orange.

Jujube—The common Jujube (*Zizyphus Jujuba*), sometimes called the Chinese date, is a relatively hardy, deciduous, rather ornamental tree becoming 20 to 30 feet tall, producing edible fruits. One tree will produce adequate fruit for home use. The fruits are one to two inches long with a dark red or brown skin, whitish to greenish colored flesh, and a cylindrical seed, sharp pointed at each end. When the fruit is steeped in sugar solution until

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California Oaks

By MYRTLE R. THORGRIMSON

This material was gathered on a trip taken to California four years ago by Mr. and Mrs. O. B. Thorgrimson. They visited the outstanding botanical gardens which included Rancho Santa Ana and the Botanical Garden at Santa Barbara. Dr. Wolf of Rancho Santa Ana circled a map designating the regions of the native habitat of the oaks, and the Thorgrims visited many of these places and studied their growth in their environment.

CALIFORNIA is noted the world over for her magnificent forests of redwoods, and as the sole possessor of those immense trees, the giant Sequoias. Equally spectacular and far more romantic are her wonderful oaks. Extending from her northern borders, down the coastal region to the extreme southern end, are found oaks, both evergreen and deciduous, on the rolling hills, up the mountain sides, in the valleys and bordering the streams whose waters find their way to the mighty Pacific.

In the early Spanish days, many a gay fiesta was held under the spreading branches of hoary monarchs, old even then, and the Franciscan fathers were said to have planted their missions only where the holly oak, *Quercus agrifolia*, flourished, for there the soil was good. Under one historic oak "of unusual size and striking appearance" at Monterey in 1602, the Spanish flag was unfurled and the sovereignty of the Spanish king was proclaimed.

One authority states that about fifty-three of the three hundred known species occur in the United States. Of this number fourteen species are found on the Pacific Coast. All of these are found in California, while one or two extend into the southern Rocky Mountain region and one variety extends up through Oregon, and Washington, as far north as Vancouver Island.

Oaks may be divided into two broad classes, the white and the black, distinguished by the color of wood and bark. Technically they are classed by different habits of producing acorns. With very few exceptions, the white oaks produce seed in one season, while the black oaks require two seasons.

Oaks adapt themselves to their environment, both as to soil and climate. Thus while the only oak native to Washington, *Q. gar-*

ryana, is in our part of the state a rather scrubby tree, it is in reality second only to *Q. lobata*, the valley white oak, in size and beauty, in a more congenial climate. It attains the greatest size in the Willamette valley and to the northward in southern Washington. On Souvies Island, near Portland, *garryanas* seventy-five to eighty feet in height and five feet in diameter are reported. It will be remembered that Souvies Island was for many years the home of Thomas Howell, famous botanist and the author of "Flora of Northwest America," published in 1897, and still one of the most important books on botany covering our area.

The leaves of the *Q. garryana* are quite deeply indented, thick and leathery in appearance. A particularly fine variety, *Q. garryana breweri*, is found in Northern California.

The valley white oak, *Q. lobata*, just mentioned and the black oak, *Q. kelloggi*, are the two other most important deciduous oaks of this Pacific region. The valley white oak is native to the broad flat valleys of California and is said to be the largest of all American oaks. It is certainly one of the most beautiful, with graceful drooping branches, as lovely in winter as in summer and it is mentioned by all the early explorers. It was called Roble by the early Spanish Californians. Paso Robles, (pass of the oaks) was so named because of the abundance of these trees in that vicinity. The leaves are typically oak shaped and the acorns are long, cartridge-like in shape and of a beautiful color. The tree sometimes attains a height of one hundred twenty-five feet. The famous Sir Joseph Hooker oak of Chico has a spread of one hundred fifty-one feet and was named in honor of one of the most famous of the early botanical writers dealing with the botany of the Pacific region. His "Botany of Capt Beechey's Voyage to the Pacific and Bering Straits in 1825-28" and a two-volume work, "Flora Boreali-Americana or the Botany of the Northern Parts of British America," also "The Life of Mr. David Douglas," are collectors' treasures. A seedling of this famous tree was given to the Arboretum by Mr. George O. Brehm of Seattle.

The black oak, *Q. kelloggi*, is a native of the foothills and mountains of California and

Southwestern Oregon. It resembles the eastern black oak, *Q. velutinus*. The tree has stout, spreading branches, forming a full, rather well-rounded crown, appearing at a distance somewhat like a maple tree. The wood is reddish, fine grained, heavy and brittle, of little value except for fuel.

The evergreen oaks comprise a group of no less than seven members and with the exception of the valley oak are more spectacularly beautiful than the deciduous group. Chief among these evergreen oaks is *Q. agrifolia*, the California live oak. McMinn and Maino quote from Dr. Albert Kellogg regarding the spelling of the name of this species. He states, "This agrifoliar oak is probably a printer's immortalized mistake for *acquistifolia* or holly leaf oak." This exception seems very well taken as our holly, *Ilex aquifolium*, has a leaf decidedly resembling the oak leaf. It is native to the coastal region of central and southern California and to Lower California and is a handsome, hardy tree with irregular spreading branches, dark green foliage, and matures its seed in one season. It lives to a great age. It is recommended by the California park administrators as one of a list of sixty-five trees suitable for park plantings for Southwestern United States.

Q. chrysolepis, or the canyon live oak is an evergreen tree twenty-five to fifty feet tall, found in the mountain canyons and on the moist ranges and flats of the Coast Range of southern Oregon, through California into Lower California and over into Arizona and New Mexico. The wood is very strong and tough and was widely used by the early settlers for mauls, tool handles and wagon parts and was often called the maul oak.

Another live oak indigenous to California is *Q. englemanni*, the Mesa oak, a medium sized tree whose leaves are somewhat bluish green. *Q. wislizeni*, the interior live oak, is found in the valleys and foothills. It is a beautiful, medium sized tree, with spreading branches. As it ranges to higher regions, it takes the form of a shrub growing amid the chaparral.

The island oak, *Q. tomentilla*, is an evergreen tree not found on the mainland; it occurs only on the islands lying off the coast. It is a small, round headed tree attaining a

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The Fruit Industry in Washington

By E. L. OVERHOLSER, F. L. OVERLEY AND
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MANY people think of the State of Washington primarily as an apple-producing state. It is true that Washington produces more apples than any other area of comparable size in the world. Furthermore, not only does the state excel in quantity but also in quality of apples produced, as determined by color, size, and flavor.

The importance of Washington as a fruit-producing state, however, is based not only upon apples, since many other fruits of excellent quality are grown in commercial quantities. In fact, nearly all fruits except those requiring sub-tropical or tropical conditions are grown. Some are grown only for local or nearby markets; most are produced in excess of local requirements and are shipped to distant markets in fresh or processed form. Soils and climate are generally very favorable for the production of most deciduous fruits. Some fruits are grown in every county of the state, the most important county being Yakima, which is well supplied with good irrigation water, and the county growing the least fruit being Adams, which has no irrigation project.

Present Importance of Fruit Growing In Washington

According to the 1940 U. S. Census, 44,625 Washington farms were reported as growing fruit trees, nuts, or grapes, and the total land in orchard fruits, nuts, and vineyards was 125,594 acres. There were 9,794 farms growing small fruits, and the total land devoted to their production was about 12,842 acres. In addition, there were 284 farms growing nursery products—trees, shrubs, vines and ornamentals—involving 867 acres, the products of which had a sales value of \$417,399.00.

The diversity and relative importance of the fruit crops grown in the state are indicated by the figures from the U. S. 16th Census in Tables 1 and 10.

1. Head, Division of Horticulture; Supt. Tree Fruit Branch Exp. Sta., and Specialist, Cranberry-Blueberry Lab., respectively.

Table 1. The Number of Trees and Production of Tree Fruits and Nuts in the State of Washington (1940)

Fruit and Nuts	Non-Bearing Number of Trees	Bearing	Bushels or pounds Produced (1939)
Almonds	533	1,887	5,536 pounds
Apples	271,934	3,404,140	23,656,317 bushels
Apricots	51,762	317,491	26,121,637 pounds
Cherries	99,252	603,278	36,072,049 pounds
Sour	20,925	216,578	7,512,713 pounds
Sweet	78,327	386,700	28,559,336 pounds
Chestnuts	3,089	96	4,150 pounds
Figs	334	563	5,923 pounds
Filberts and Hazelnuts	84,180	164,674	843,276 pounds
Grapes	511,293 (vines)	985,648 (vines)	12,579,840 pounds
Nectarines	161	191	195 bushels
Peaches	189,411	610,620	1,660,007 bushels
Pears	119,309	1,438,457	5,530,954 bushels
Bartlett	73,810	1,050,261	4,075,080 bushels
Other Varieties	45,499	388,196	1,455,874 bushels
Plumcots	12	471	32,780 pounds
Plums and Prunes	86,867	900,016	45,980,006 pounds
Quinces	322	1,760	62,880 pounds
Walnuts, English	11,387	27,617	423,207 pounds

The Apple Industry of Washington State

The apple industry of the State of Washington has an investment of between \$75,000,000 and \$100,000,000. This is in orchards, storage plants, packing plants, and other facilities necessary for the production and packing of the commercial crop, as well as by-product plants, such as dehydrators, etc. The 1940 apple crop (28,804,000 bushels) constituted about one-fourth of the crop of the United States.

There are about 60,000 acres of high-production apple orchards, operated by 6,000 commercial apple growers, which, together with their families, comprise 30,000 people who are largely dependent upon the production of apples. In addition, normally there are over 200,000 people either dependent or partially dependent upon the industry, comprising orchard labor.

Over 7,500 carloads of box shoo, a vast quantity of wrapping paper, fertilizers, sprays, and other products necessary in connection with the production and marketing of the crop, are used each year. For example, in 1939 there were 14,579,019 pounds of spray materials used in the State of Washington.

The apple industry affects every community and almost every person in the State in one way or another. The value of the 1942 apple crop of the state was estimated at \$40,000,000. Ninety-five per cent of the apples are sold outside of the state in all parts of the world in normal times.

From every producing acre of orchard,

about \$500 each year goes to allied industries—the box people, spray people, paper companies, and labor—before the grower gets returns from the crop for taxes, interest on his investment, or money to feed and clothe himself and his family.

Washington normally exports five or six million boxes of apples but the war has, of course, interfered. In 1930, Washington shipped 44,800 carloads of apples, which together with truck shipments, would probably have brought the commercial crop that year to 50,000 carloads. In 1938, the state shipped by truck and rail 29,000 carloads. In 1939, it is variously estimated that from 20,000 to 22,000 carloads were shipped. During the 1942-43 season, it is reported that 26,370 cars of apples were shipped from Wenatchee-Yakima districts. Production of apples in Washington from 1933 until the present war generally exceeded available market outlets. This resulted partially from over-expansion of the industry within the region, and partly from improved practices of production and marketing in competing areas located nearer the principal consuming centers. Reduction in number of apple trees from 1935 until about 1941 was evident, considerable acreages of orchards having been removed, especially on marginal land, with undesirable varieties or operated by poor growers, but the actual production was not greatly curtailed.

Commercial apple production in the United States in 1942 was about 127 million bushels, which was about 3 per cent larger than the

1941 crop of 122 million bushels. In Washington, where the average apple production for the 6 years, 1934-39, was 28.8 million bushels, 23.7 million bushels were produced in 1939, 27 million bushels in 1941, and about 27.6 million bushels in 1942.

Important apple producing counties. The five leading apple producing counties in order of importance at present are Yakima, Chelan, Okanogan, Douglas, and Spokane (Table 2). Grant county in 1939 harvested 233,645 bushels. Other counties that have from 20 to 40 thousand bearing apple trees, which annually produce from 50 to 120 thousand bushels of apples each are Klickitat, Snohomish, Clark, Lewis, Benton, King, Pierce, Whatcom, Walla Walla, Columbia, and Skamania.

Table 2. Important Apple Producing Counties of the State of Washington (1940)

County	Number of Trees		Bushels harv. 1939
	Non-Bearing	Bearing	
Yakima	77,371	1,200,600	10,501,754
Chelan	71,358	826,124	6,267,425
Okanogan	45,489	485,102	3,468,801
Douglas	15,633	244,678	1,418,957
Spokane	13,367	94,609	403,401

Commercial apple varieties. In 1939, the principal apple varieties shipped from Washington were Winesap (about 49 per cent of the total), Delicious, including the bud sports of the variety such as Starking, Richared, Shotwell (32 per cent), Jonathan (8 per cent), Rome Beauty (5 per cent), and other varieties (7 per cent). In 1942-43 season, the apple varieties shipped from North Central Washington were Winesap (about 30 per cent of the total), Delicious (about 37 per cent), the Red Delicious, such as Starking, Richared, Shotwell (14.5 per cent), Jonathan (7 per cent), Rome Beauty (5 per cent), and other varieties (7 per cent). The production of Golden Delicious has been gradually increasing although as yet it amounts to only a small proportion of the total crop shipped.

*Canned apples and apple sauce.*² The pack of canned apples in Washington in 1940 was only 513,766 cases, as compared with 809,195 in 1939. This resulted chiefly from the loss of export markets. With increased government buying for the armed forces and improved general economic conditions throughout the

country, the demand increased considerably. In 1941, Washington canned 945,493 cases of apples. In 1942, there was a decline, but the quantity of apples frozen increased to replace the canned product among pie bakers, etc.

Dried apples. In the Pacific Northwest, dried apple packers compete with apple canners for fruit, and in 1941 the dried apple pack stayed at about the 1940 level of 3,500 tons.

Cider and vinegar. According to the U. S. Census Bureau in 1939, the Washington output by seven plants producing cider and vinegar was valued at \$370,583.00.

Apple Juice. It is estimated that over 100,000 cases of apple juice were packed on the Pacific Coast during the 1941 season.

The Pear Industry of Washington

The 1941 pear production for the United States was 29,530,000 bushels³ and 31.2 million bushels were produced in 1942. The United States pear production has nearly doubled during the past 20 years, the increase having largely occurred in the Pacific Coast states. In 1939, the State of Washington produced 5,530,954 bushels (Table 1); in 1941, about 7.0 million; and in 1942, about 6.7 million bushels. The value of the 1942 pear crop of the state has been reported as \$12,000,000.

During the five years, 1934 through 1938, approximately 22 per cent of the pear crop was canned and about 5 per cent was dried. From 1934 to 1938, about 76 per cent of the dried pears and about 30 per cent of the canned pears and considerable quantities of fresh pears were exported. Prior to the present global war, large quantities of late varieties of fresh pears, Beurre d'Anjou, Hardy, Comice, and Winter Nelis went to foreign markets. In addition to the varieties mentioned, the Flemish Beauty, Bosc, and other varieties are also commercially grown.

Important pear producing counties. Yakima County (Table 3), produced nearly three-fifths of the pear crop of the State in 1939, and over three-fourths of this production, or slightly over three million bushels, was of Bartlett pears, and slightly less than 700,000 bushels of other varieties. Chelan County is

2. The data pertaining to the utilization of all the fruits are from the 32nd and 33rd Annual Yearbooks and Stat. Review of Western Canner and Packer (1942 and 1943).

3. U.S.D.A. Crop Reporting Board, Bur. Agr. Econ., Dec. 1942.

Table 3. Important Pear Producing Counties of the State of Washington (1940)

County	Bartlett No. of Trees		Other var. No. of Trees		Bushels harv. 1939	
	Non-Bearing	Bearing	Non-Bearing	Bearing	Bartlett	Other var.
Yakima	50,453	800,972	15,742	196,694	3,154,356	662,591
Chelan	9,963	107,056	19,546	94,303	507,590	474,047
Douglas	1,535	30,088	1,517	10,660	88,370	36,851
Okanogan	162	13,144	232	8,860	69,977	39,496
Klickitat	621	6,122	1,967	18,172	12,767	67,738
Clark	1,533	22,628	204	3,736	49,975	9,018

second, producing about one-half million bushels of Bartlett and nearly the same amount of other pear varieties.

Other important pear producing counties are Douglas, Okanogan, Klickitat, and Clark. Clark County produces nearly five times as many Bartletts as it does of the other varieties, while Klickitat produces nearly five times as many of the other varieties, chiefly the Beurre d'Anjou, as it does of the Bartlett. Douglas and Okanogan produce about twice as many Bartlett pears as they do of the other varieties. Certain additional counties annually produce from 15 to 60 thousand bushels of pears, viz., Grant, Skamania, Benton, Spokane, Whatcom and Skagit.

Canned pears. The canned pear pack in the Pacific Northwest is the largest of all the fruit canned. The canning of pears in Washington has tended to increase in amount during the last 10 years. In 1941 the number of cases of all sizes of canned pears in Washington was 2,389,712, nearly all being of the Bartlett variety.

Quinces. The number of quince trees and the production in Washington has varied widely over the last 30 years. In 1909, there were far more quinces grown and produced in the state than is now the case. The industry shows a slight increase now in contrast with 1929. In 1941, there were 322 non-bearing and 1,720 bearing trees that had produced, in 1939, about 62,880 pounds.

The Peach Industry of Washington State

Upon the basis of non-bearing and bearing peach trees as well as production, Yakima county ranks first, producing about two-thirds of the entire crop in 1939. The next ranking counties in order of production are Benton, Chelan and Douglas (Table 4). Whitman, Okanogan, Asotin, and Garfield produce from nearly 50,000 to about 20,000 bushels of peaches annually. Since about 1929, the production of peaches in Washington has tended

to show a slow gradual increase, and in 1942 was about 2.2 million bushels out of 65.3 million bushels for the United States.

Table 4. Important Peach Producing Counties of the State of Washington (1940)

County	Number of Trees		Bushels harv. 1939
	Non-Bearing	Bearing	
Yakima	83,589	403,508	1,109,038
Benton	21,370	48,528	165,444
Chelan	10,643	31,443	105,061
Douglas	15,083	32,120	95,983

While the production (4,338 bushels in 1939) is relatively low, the number of non-bearing trees in King County is relatively high (7,558) in comparison with the number of bearing trees (4,859). The same is true in Lewis county, producing 355 bushels in 1939, having 1,390 non-bearing trees and 386 bearing trees; and in Stevens county, producing 1,872 bushels, having 1,691 non-bearing and 1,396 bearing trees.

Canned peaches. Since 1934, Washington has made substantial gains in canned peaches. The pack in 1940 was about 300,000 cases, and in 1941 the record pack of 439,092 cases of all sizes was produced. This was about one-sixth of the total peaches canned in the United States.

Frozen peaches. Frozen peaches showed a decrease during 1940. In the Pacific Northwest the pack dropped from 2,400,000 pounds in 1939, to 718,300 pounds in 1940. In 1941, there was an increase to 2,230,418 pounds, or about one-third of the total for the United States, but in 1942 the pack nearly doubled to 4,226,210 pounds.

Nectarines. There are very few nectarines grown in Washington. In 1940 there were 161 non-bearing and 191 bearing trees that produced in 1939 about 195 bushels of fruit. The nectarine is a botanical variety of the peach and has the scientific name, *Prunus Persica*, var. *nucipersica*.

(Continued on Page Thirty)

Notes on How to Grow Herbaceous Peonies

By H. L. COLLIER

SELECT a place to plant your peonies away from vigorous shrubs and trees; too much shade is to be avoided in order to insure good growth and blooms. For permanent planting set them three to four feet apart as they should be left undisturbed for from eight to ten years.

Peonies will thrive in good, ordinary garden soil, sweet, not acid; just be sure that the drainage is good. The soil should be prepared for planting by digging holes sixteen inches deep, wide enough to accommodate the roots, and mixing into the lower half of the soil a generous quantity of well decomposed manure, or, if this is not available, a teacupful of bone meal.

The peony roots should be set so that the eyes are two inches below the surface, covering the eyes or crown with fine, clean soil. Deep planting will prevent the production of blooms, and if planted too shallow the eyes and crown may become injured. Be sure that none of the fertilizer comes in contact with the roots and never permit any fertilizer to be placed over the crowns.

Three to five eye divisions are the most desirable and appear to develop into better clumps than larger divisions.

The best time to plant is from the middle of September until the ground freezes. Early spring planting may be done but it is not recommended. Newly planted roots should be mulched after the ground freezes (not before) to prevent the roots from being lifted when thawing commences. The mulch may be leaves, fir boughs, straw or dried ferns and should be removed as soon as all danger of frost is past. Well established clumps need no mulching.

Shallow cultivation through the spring and summer will promote growth and blooms and irrigation should be done whenever the ground becomes dry.

Peonies should not be planted in the same place where other peonies have been grown, unless the old soil is removed and replaced with good, fresh, new soil. Dusting the crowns of the plants with bordeaux mixture when the eyes appear above the ground in the early

spring and again when the stems are six inches high will, in a large measure, prevent the attack of fungus diseases.

To secure fine, large blooms disbudding must be resorted to, leaving only the terminal bud on each stem. Cut the blooms in the early morning or late evening, being careful not to take too much foliage from the plant. The cut flowers last much longer when the ends of the stems are dipped into boiling water.

About the middle of October all of the tops should be cut to within two or three inches of the ground and destroyed. Do not put them on your compost pile.

Peonies are long lived plants and are one of the most cherished perennials of our gardens. The American Peony Society has published a comprehensive manual on the peony which is available at the public library and is recommended to those who wish to be informed upon the history, species, and the many varieties, also the propagation, hybridization and treatment of peony diseases.

1 1 1

Some Outstanding Ornamental Shrubs

By SHERMAN INGELS

A REAL wealth of enjoyment is in store for those gardeners who take time to really cultivate and carefully study many of our less known but generally available shrubs. Some are not striking in general appearance but very interesting on close scrutiny. Such is the *elaegnus* group, used in larger border plantings as screen and background shrubs. Their flowers are inconspicuous but they have a wealth of foliage free from insect pests. Upon close examination you will find the new twigs and the undersides of the leaves painted with silver or gold.

Elaeagnus umbellata parvifolia has silvery stems and leaves, with fruit resembling small plums suitable for jam making. This shrub grows to about ten feet in height and does well in ordinary well drained soil. *Elaeagnus longipes*, Gray (*E. multiflora*, Thunb. ed.) has light brown or gold-colored stems and grows to about six feet; the fruit is red and has an agreeable but slightly acid flavor. This shrub is quite hardy and will stand for many years without pruning or special care. Probably the best known species in this group is *E. angustifolia* L., commonly known as the

Oleaster, or Russian Olive. The foliage and stems have a gray cast which makes it a good contrast shrub.

One of the daintiest of the broad leaved evergreen shrubs you can use in your garden or foundation planting is *Nandina domestica*, Thunb. It is a great favorite in gardens of China and gives a distinct Oriental appearance, having stiff stalks and evergreen leaves like the bamboo except that they are bushy and grow gracefully into a series of umbrella like branches. The top of each stalk is terminated with a panicle of white flowers which later carry bright red berries. The young leaves are fringed with red and in winter a portion of the leaves turn to a red and bronze, making a gorgeous effect. Gardeners who have the mild, moist climate near the salt water should have great success with this plant because it likes some humidity and will not stand hard winters. Probably its best situation would be in a protected place in the garden planted in well fertilized sandy soil and given about as much water as a well kept lawn. It will do well in either sun or shade, turning to a brighter color in the sun, but it will not stand abuse such as it would get on windy corners or along paths where it would be brushed against.

Buddleia or summer lilac is usually thought of as a large shrub with long, nodding panicles of lilac flowers. However, one form, *Buddleia globosa*, has orange-yellow flowers in dense, round clusters borne on long stems. In growth and general appearance this shrub is quite similar to the common buddleia though not quite so hardy. Leaves piled around the base of the plant will protect the roots from which new shoots will grow to a height of six feet in one year. All buddleias should be pruned severely each spring before growth starts.

Of the large viburnum group, generally known, two are exceptional and most worthy of cultivation, *Virburnum carlesi*, Hemsl. and *V. burkwoodi*, Burkwood. Both are very fragrant, compact, neat growers and when given a good sunny exposure in well fertilized loam they make specimen plants everyone will admire.

For Mother's Day bloom in the garden nothing quite equals *Daphne cneorum*, L., one of our prettiest evergreen shrubs. The deep

pink, waxy clusters of bloom are delightfully fragrant. The plants are about two feet across and eighteen inches tall, growing conditions being favorable, though it is seemingly indifferent to the type of soil. For added enjoyment it has a second blooming period during summer and early fall. It is a real garden "must have," but do avoid deep planting and use well rotted cow manure for fertilizer.

If a sweet-scented, cut flower is desired the Spanish broom (*Spartium junceum*, L.) will furnish blooms throughout the summer and fall. The yellow flowers are produced abundantly on long, loose spikes, on a bright green shrub with broom-like branchlets. It will not stand low temperature but will grow in dry, rocky slopes without ordinary cultivation, which characteristic makes it a very desirable plant. Height, six to eight feet.

A most interesting hydrangea is the *H. quercifolia*, Bartr., the oak leaf hydrangea, a rather rare plant in this locality, but a native of the south central states. It is not evergreen but the large leaves take on a beautiful purple cast in the fall. The flowers, partly sterile, appear in large, flat clusters, the sterile part turning to purple. Under good conditions they will grow to six feet. These artistic characteristics and the fact that it blooms in late summer should give it a place among the unusuals for border planting.

If one desires the effect of clouds of smoke rising from the shrub border, that effect can be had by planting the smoke tree. In the summer the large flower clusters change into feathery seed panicles, produced in great profusion, and having a purple color which gives the appearance of clouds of smoke. As an added attraction the leaves, before dropping, turn to brilliant colors in late fall. Being some relation to the sumac it is quite hardy in the Pacific Northwest and will grow in most any well drained soil, even on dry, rocky slopes. Two varieties are available. *Rhus cotinus* (*Cotinus coggygria*, Scop.) from Southern Europe and Asia, grows to about twelve feet in height and has the larger flower panicles, but less brilliant fall colors than *Rhus cotinoides* (*Cotinus Americanus*, Nutt.), the American variety, native of our southern states. The latter attains the height of thirty feet, so it can be trained as a small tree or large bush.

The Arboretum Bulletin

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Editor JOHN H. HANLEY
Manager MRS. ROY PAGE BALLARD

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ARBORETUM FOUNDATION OFFICE HOURS

9 a. m. to 12 noon—Monday through
Friday.

The Arboretum

THE material in this issue of the ARBORETUM BULLETIN has been developed along two principal lines. First, we have reasoned that it would be timely to present opinions of a number of persons who are in a position to know, and who can, therefore, write with authority regarding the nature of our work. We feel that a fuller knowledge of the ultimate value of the Arboretum to the Northwest, and to the country as a whole, will act as a desirable stimulant to those many, loyal persons who make up the membership of the Foundation. Let us hope that the thoughts which have been brought out by Mr. O. B. Thorgrimson, president of the Arboretum Foundation, Dr. Donald Wyman, horticulturist at the famous Arnold Arboretum, and Mr. Paul D. Brown, superintendent of the University of Washington Arboretum, will serve to keep your interests alive and will make easier the task of persuading other prospective members that they too, will be serving a good cause by becoming affiliated with the Foundation.

A Great Industry

Secondly, we have been able to continue the policy of including, as often as possible, thorough discussions of those important industries which are based upon plants and plant culture. We are happy to present, in this issue, one of our state's greatest and most famous institutions, the fruit industry. To be sure, every native of the state is aware of the world-wide fame that has come to the Washington apple, (the rather remote cartoon in a popular national weekly about "California" apples notwithstanding). But it is doubtful that even the native sons have more than a fraction of the full comprehension of

either the immensity, or of the degree of diversification that the fruit industry has attained within our boundaries. If you want to enjoy a swell of great pride in a Washington development, we commend a more than casual reading of the lead article by Dr. E. L. Overholser and his associates.

In support of the lead we have received three additional manuscripts related to distinct phases of Washington horticulture. They were prepared with the idea of giving out the best and most up-to-date information on fruit culture in the home garden. Unfortunately, space limitations make it possible to publish only two of them; the third will appear in the December issue. We feel that the publication of these articles is particularly fortunate at a time when our government is urging that we produce as much as possible of our own food and when more and more fruits (trees, shrubs, and vines) are being planted in home gardens.

1 1 1

Among Our Contributors

AS HAS been stated elsewhere in the BULLETIN, we are making a feature of the fruit industry in this issue. In order to to procure the best possible information on this subject, we went to the real authorities, the men at Washington State College and its branch experiment stations in various parts of the state. Dr. E. L. Overholser, who, incidentally, is a member of the Arboretum's advisory council, having been appointed to it by Dr. Lee Paul Sieg of the University of Washington, is the head of the horticulture department at W.S.C. In that capacity, he has made innumerable important contributions to the growth and development of the fruit industry in our state. We feel highly complimented to have a man of his caliber show such a real interest in the development of the Arboretum. Dr. Overholser makes periodic tours of the state, visiting the various experiment stations for the purpose of co-ordinating research work, and it has been our pleasure to have entertained him as a visitor at least once each year. His enthusiasm for the Arboretum and its work is most pleasing.

1

Dr. Overholser, in developing the three phases of the fruit industry that are presented herein, has enlisted the assistance of

several of his colleagues. One of them is Mr. D. J. Crowley of Long Beach, Washington. Mr. Crowley is in charge of the cranberry-blueberry investigations that are being carried on in the laboratory there. He is looked upon as one of the leaders in cranberry production throughout the entire West. Since the establishment of the Cranberry-Blueberry Laboratory, this industry has grown materially, due to effective measures which have been developed for control of insects, diseases and weeds in the cranberry bogs, frost protection, irrigation and general bog management.

Mr. D. F. Allmendinger is assistant horticulturist of the Washington Agricultural Experiment Stations. He is at present doing investigational work in vegetable and fruit production in Clark County, Washington in an experimental project conducted in cooperation with the State Planning Council, the Clark County Planning Commission, the Agricultural Extension Service of Washington State College, the State Department of Vocational Agriculture, the State Department of Agriculture and the U. S. Department of Agriculture.

Mr. F. L. Overley is assistant Horticulturist and superintendent at the Tree Fruit Branch Experiment Station at Wenatchee. This station is carrying on investigational work in the fields of pomology and disease control, spray residue studies, and practically all phases of fruit growing pertinent to the fruit industry in the state.

Last March we presented an article on Grape Culture in Irrigated Eastern Washington. One of the authors of that excellent dissertation was Mr. W. J. Clore, assistant horticulturist and horticulturist of the Irrigation Branch Experiment Station at Prosser, Washington.

One of our most enthusiastic gardeners in this region is Seattle's city treasurer, Mr. H. L. Collier. Unlike many of our local authorities, Mr. Collier has developed an interest in a rather large number of ornamental plants, among them, irises, roses, rhododendrons, and peonies. We are proud to give you his notes on peony culture in this issue of the BULLETIN.

Dr. Donald Wyman of the Arnold Arboretum is well-known in horticultural circles throughout the country. He has always been noted for his enthusiasm and for his organizing abilities. We are glad to include his comments on what our Arboretum can contribute to plant study in the Northwest and in the country as a whole.

Mr. Sherman Ingels has been superintendent of the Metropolitan Park District of Tacoma for a number of years. He is a graduate landscape architect from the University of Illinois. With that background and with the experience of handling the many outstanding types of shrubs that can be grown in the Puget Sound region, his remarks can be looked upon as being really authoritative and worthwhile.

Mr. Paul D. Brown was appointed superintendent at the University of Washington Arboretum on May 1 of this year. He came to us with 24 years experience in various horticultural lines; 12 years under glass, and 12 years outside. His last position was at the Eastern Washington College of Education at Cheney. The experience which he gained there, as well as in other parts of Eastern Washington, enables him to appreciate the potential value of our Arboretum to the people who live east of the Cascade mountains.

Mr. and Mrs. O. B. Thorgrimson have given sound support to the Arboretum from its inception. Solely as a result of their efforts we now have a collection of some forty species (and a few varieties) of oaks. The collection of the acorns and the young plants was begun by the Thorgrimsons a number of years ago and practically all of the trees thus produced have been planted in their permanent locations. After the allotted number had been placed in the oak section, the surplus of about 200 trees was planted on the west slope of Foster Island where they will make a most colorful display in the fall. We are fortunate in having access to Mrs. Thorgrimson's information on the oak species.

Mr. Thorgrimson, as president of the Arboretum Foundation, writes knowingly about the value of the Arboretum.

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I hereby apply for membership in the Arboretum Foundation and remittance for same is enclosed to cover dues for the next succeeding 12 months.

Name

Address

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SPECIAL NOTICE

To keep memberships in the Arboretum Foundation in good standing, dues should be paid during the month payable. A new system has been established at the Foundation office, whereby memberships payable over three months will be dropped from the active membership rolls and the BULLETIN will be discontinued.

The Arboretum Foundation is moving September 15th to 414 Walker Building, Second and University. The telephone number will be the same—SEneca 0920, and Mrs. Walter Schibig, our effective executive secretary and board member, will be on hand for consultation as heretofore, Monday through Friday, 9 to 12.

We take this opportunity to express the appreciation of the Arboretum Foundation to the Metropolitan Building Company for their many years of generous cooperation in our work and the hope that we will continue to merit it in the new location which is also under their management.

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WESTERN WASHINGTON

(Continued from Page Nine)

nose when grown on the west side. Wealthy follows Yellow Transparent in season of maturity and is followed in turn by Grimes Golden. Some of the later ripening varieties that might well be used are Golden Delicious, White Winter Pearmain, and Yellow Newtown. Gravenstein and especially Northern Spy are slow in coming into bearing.

*Filberts*⁸—Du Chilly has been the most consistent and heaviest producer, with Barcelona second. Daviana has highest quality of kernel but its buds are susceptible to injury by bud mite. The variety Royal produces the largest, most attractive nut, but is low in yield and the shell is thick.

Walnuts—While not especially adapted to the home garden, because they are relatively slow in coming into bearing and eventually become very large trees, the Franquette variety of English or Persian walnuts can be grown in much of Western Washington, especially in Clark County.

8. For further directions in filbert growing, see "Filbert Growing in Washington," by J. C. Snyder, State Col. of Wash. Ext. Bul. 263:1-20, 1941.

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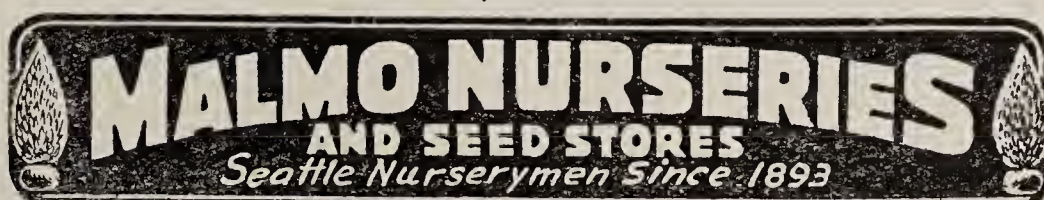
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EASTERN WASHINGTON

(Continued from Page Twelve)

candied, it has somewhat the flavor of dried dates.

Apples—While apples are not generally recommended for the home garden in the commercial apple growing districts because of the codling moth problem, nevertheless, they are a nice addition to the home fruit garden on the farm in non-commercial-fruit-growing districts. If grown on dwarf understocks and adequately sprayed, they can be grown nearly anywhere in the state. There are many excellent varieties of apples from which to choose for home planting.

With the idea of having fresh apples from midsummer, throughout the fall, and with cold storage (32° F. to not above 40° F.), throughout most of the winter, a list of varieties can be suggested as follows:

1. Yellow Transparent is one of the earliest yellow apples to ripen and is excellent for sauces and pies. When well ripened without the flesh becoming mealy before picking, its tart flavor makes it a pleasing apple to eat.

2. Early Harvest is a yellow apple ripening shortly after the Yellow Transparent, but higher in quality to eat fresh.

3. Lodi, another yellow variety ripening soon after the Yellow Transparent, is large and attractive and good for dessert.

4. Melba, a red apple, is medium-early in ripening.

5. Red Astrachan is highly colored, tender, crisp, juicy and sprightly flavored for cooking and eating, and has a fairly long season of usefulness.

6. Sweet Bough, a yellow apple with white flesh, has a sweet flavor and is very good to eat fresh.

7. Wealthy, a late summer apple, attractively colored with a greenish-white flesh, is sprightly flavored and excellent for sauces and pies.

8. Mother is a beautiful red apple, with tender, rich flesh of best dessert quality, but now nearly lost from cultivation, because it is desirable only in the home orchard.

9. Jonathan and Jon-a-red (a mutation of the Jonathan with a more intense red color development) are attractive tart apples ripening in early fall and are good for both eating and cooking.

10. Golden Delicious is a yellow, high qual-

ity, attractive apple with crisp golden colored flesh having sprightly flavor, for eating fresh or baked.

11. Delicious, or Starking (a mutation of the Delicious with a darker red color of skin) ripens about the season of Golden Delicious but has a milder, slightly sweeter flavor.

12. Yellow Newtown is a late, good keeping apple, higher in eating quality than either the Rome Beauty or the Winesap, but tends to an alternate bearing habit.

Pears—It may not be advisable to attempt to grow pears in the home fruit garden because of codling moth infestation, blight infection, and other troubles. There are, however, a number of varieties of pears, high in quality and excellent to eat. Five excellent varieties of pears listed in order of time of ripening are: Bartlett, Hardy, Comice, Seckel, and Beurre d'Anjou.

Nuts—For a discussion of filbert growing see article entitled, "Fruits for the Home Garden in Western Washington." While slow coming into bearing, and producing large trees, the Thomas variety of black walnut can be suggested.

Cultural Directions

The amateur fruit grower produces a limited quantity of several varieties of a number of kinds of fruits. He desires a succession of fresh, fine flavored fruit throughout much of the summer and fall. By canning, preserving, drying, and freezing, the surplus fruits are also available the year around. The surplus fruit should not go to waste. Consumption of home-grown fruits, together with purchases of kinds not feasible to grow successfully, will greatly benefit the diet and improve the health.

Frequently, when only a limited area is available, it is advisable to topwork³ several varieties of the same kind of fruit upon a single tree in order to provide for cross-pollination needs, to obtain variation and to give varieties having different times of ripening, thus prolonging the season during which fresh fruits can be harvested.

*Understocks*⁴—The ultimate size attained by a fruit tree largely depends upon the species, variety, and the nature of the understock upon which it is propagated. In the

3. For directions as to top-working, see "Propagation of Trees and Shrubs," by Guy E. Yerkes, U.S.D.A., Farmers' Bul. No. 1567:1-52. 1932.

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home fruit garden it is desirable to grow fruit trees in dwarf form since with the smaller size of each tree, a greater number and variety of fruits can be cared for within a limited area. Dwarf fruit trees also are more conveniently pruned, sprayed, and thinned, and the crop can be more readily picked than from standard trees. Some kinds of trees, such as the quince, sour cherry, and the filbert, are naturally semi-dwarf. Others, such as the pear and apple, may be dwarfed by obtaining, from a nursery, trees that have been propagated upon slow growing roots or dwarfing understocks. It will probably be necessary, however, to place special orders with a nurseryman at least one or two years in advance in order to obtain the desired varieties of fruit trees propagated upon special dwarfing understocks.

Dwarf apples—For dwarfing apples, the Malling IX (Jaune de Metz, or Yellow Metz Paradise) understock is recommended. This is an excellent understock for the home garden and appears to unite satisfactorily with most varieties of apples.

Dwarf apricots—The apricot is not as successfully dwarfed as some fruits, and while the union is not always satisfactory, for backyard planting it may be propagated upon *Prunus Besseyi* B. as a dwarf tree.

Dwarf cherries—The sour cherries propagated upon the Mahleb (*Prunus Mahaleb*, L.) as an understock make a relatively small tree, but either the Sand cherry (*P. pumila* L.) or the Western Sand cherry (*P. Besseyi* B.) used as understocks produce much smaller crowns.

The sweet cherry is not so satisfactory dwarfed, but amateur fruit growers may employ as understocks either the Sand cherry or the Western Sand cherry.

Dwarf peaches—Peaches are not too successful as dwarf trees, but for this purpose the Western Sand cherry (*Prunus Bessyi* B.) may also be used as propagating stock.

Dwarf pears—As an understock for dwarf pears either the Angers quince (East Malling Type A) or the East Malling Type C may be used, the latter producing the smaller tree.

Dwarf plums and prunes—For most varieties of plums and prunes the sand cherries (*Prunus pumila*, L., or *P. Besseyi*, B.) may be used as understocks to produce the desired effect.

*Pollination requirements*⁵ — While sour cherries, most apricot varieties, and many varieties of peaches are self-fertile and set fruit without provision for cross-pollination with a second variety, many varieties of apples, pears, sweet cherries, and plums will not set fruit if the blossoms are pollinated with their own pollen, or with pollen from another tree of the same variety.

Most apples will set better crops when cross-pollinated as when several varieties are grown in a home garden. The mutations of a given variety of apple, however, are likely to be comparable to the parent. For example, the Delicious and its mutations, Starking, Richared and Shotwell are self- and inter-sterile.

The varieties of sweet cherries grown are self-sterile, and the Bing, Lambert, and Napoleon (Royal Anne) are inter-sterile. The Deacon, Black Tartarian, and Republican are used as pollinizers.

The peach varieties are self-fertile except the J. H. Hale, Candoka, Mikado, Halberta, and Chinese Cling, and these should all be planted with a variety other than the four, for cross-pollination.

Several varieties of Japanese plums should be planted together, and the same is true of European varieties, in order to insure cross-pollination.

Apricots are self-fertile, except possibly the Riland, which should be planted with another variety.

When and how to plant—In Eastern Washington the apple, pear, sour cherries, and European plums may be fall planted; the other kinds such as apricots, peaches, and sweet cherries should be planted as early in the spring as the soil can be prepared.

The trees, however, should be dormant, with no buds pushing into growth at the time of planting. Great care must be exercised to avoid the drying out of the roots. The fruit and nut trees should be planted about the

4. For a more complete discussion of understocks and nursery trees, the reader is referred to "Nursery Fruit Trees, Dwarf and Standard Understocks, Their Handling and Planting," by E. L. Overholser, F. L. Overley, J. H. Schultz and D. F. Allmendinger, Wash. Agr. Exp. Sta., Pop. Bul. No. 170:1-63. 1943.

5. For a further discussion of pollination and planting, see Wash. Agr. Exp. Sta. Pop. Bul. No. 170, obtainable free from Dept. of Horticulture, State Col. of Wash., Pullman.

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same depth they stood in the nursery. Trees on dwarfing understocks should not be planted deep enough to permit the lower part of the trunk of the variety tissue to be in the ground. Otherwise the scion tissue may strike root and the tree lose its dwarf habits. The soil should be firmed about the roots and thoroughly wetted when the tree is planted.

Pruning—When the fruit trees are unbranched whips for the home orchard it is advisable to cut back to 15 to 18 inches. If they have good sized side branches properly spaced along and about the trunk, three or four should be left.

The tree should be pruned so as to have strength to bear a maximum crop of fruit with a minimum of pruning to accomplish this. Branches that crowd or cross, suckers and broken or dying shoots should be cut out. Pruning can be done most safely in late winter after danger of severe winter temperatures is past, but before growth starts in the spring.

When trained as espaliers or cordons or against walls, fences, or as borders, trees on dwarf understocks require detailed pruning of individual twigs and fruit spurs. In the summer certain young branches may be bent and tied in place to train to the form desired, to check growth and to induce fruiting. Growth that is too vigorous may be pinched back anytime, and growth that is weak may be safe-guarded to maintain balance and symmetry.

With backyard plantings in areas of limited size, root pruning may occasionally be required to keep even the dwarf forms from getting too large. It is very important to prevent rooting of the scion, else the dwarf habit will be lost.

*Fertilizers*⁶—In backyards of central and eastern Washington the vigor of fruit trees can be maintained by annual applications of nitrogen, scattered on the ground surface area underneath the spread of the branches. A commercial nitrogenous fertilizer is applied, preferably any time from December to March, especially when the ground is covered with snow. For trees around which the ground is

cultivated each year, apply about one pound of sulphate of ammonia for each year of age of the tree until it is about four years old, and thereafter about four or five pounds annually. If the trees are grown in sod slightly larger applications may be made.

Harvest maturity—Peaches, apricots, sweet cherries, plums and prunes, and summer apples attain their highest quality for eating fresh when permitted to ripen on the tree.

Pears and fall and winter apples are picked when well colored and of good size and maturity, but are placed at a temperature of 60° to 70° F. to ripen until ready to eat. Summer and fall varieties of apples and sour cherries can be picked before sufficiently mature for eating and used then for sauces, pies, and cooking.

Utilization—Many home grown tree fruits can be frozen, dried, canned, or cold stored. The reader is referred to publications of the State College of Washington which can be obtained free by addressing that institution at Pullman, Washington, as follows: (a) Locker Freezing of Fruits and Vegetables, Pop. Bul. No. 161; (b) Home Drying of Fruits and Vegetables with the W. S. C. Dehydrator, Pop. Bul. No. 172, both of the Wash. Agr. Exp. Sta.; Extension Bulletins No. 183, Canning Fruits and Vegetables, and No. 209, Storage.

Spraying—In every section there are diseases, insects, unfavorable weather, and other troubles to be combatted and, whenever possible, controlled. The reader is referred to his county agent or the State College of Washington for advice in the control of insects and diseases, since space available does not permit adequate discussion (See State College of Washington publications: (a) Apple Scab, Extension Bul. 190; (b) Pear Psylla in Washington, Ext. Bul. 255; (c) Recommendations for Codling Moth, Orchard Mite and Scale Control in Washington for 1942, Ext. Bul. 279; (d) Diseases of Pears in Washington, Wash. Agr. Exp. Sta., Pop. Bul. No. 171; Virus Diseases in Washington, Wash. State Dept. Agr. Bul. No. 1; and (e) Orchard Insects of the Pacific Northwest and Their Control, by E. J. Newcomer, U. S. D. A. Circ. No. 270, 1941).

6. Further helpful information can be obtained by requesting of the Dept. of Horticulture, State College of Washington, Pullman, a copy of the "Report of the Northwest Fertilizer Conference of Horticulturists."

CALIFORNIA OAKS

(Continued from Page Fourteen)

height of not more than forty feet and having leaves of unusual beauty and distinctive acorns.

The tan bark, *lithocarpus densiflora*, is a member of the oak family, although not a true oak. The leaves and bur-like acorn cup resemble the chestnut. It is found as far North as the Umpqua River in Oregon and continues South to the Santa Inez Mountains. The bark is used extensively in tanning leather and it is said to be as important to the leather industry on the Pacific Coast as the chestnut oak, *Q. prinus*, is in the east.

These California oaks with their great ability for adjusting themselves to a varied habitat, can practically all be grown in our climate and the deciduous ones should be considered seriously as providing overhead shade for acid-loving shrubs. The roots of the oak penetrating deeply into the soil, do not interfere with such shrubs as azaleas, rhododendrons and kalmias, and their leaves provide the perfect mulch for such. Proper pruning will control the amount of light needed by the plantings below.

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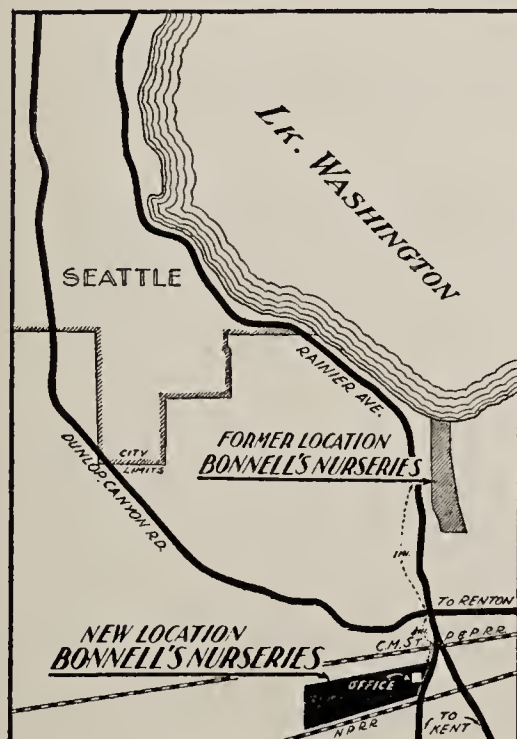
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FRUIT INDUSTRY

(Continued from Page Seventeen)

The Plum and Prune Industry of Washington

The plum and prune industry, upon the basis of bearing trees and production, has been declining in Washington since about 1929, but in 1942 the state produced 24,600 tons of the total United States crop amounting to 118,700 tons.

In number of bearing trees and present production, Clark county ranks first; but upon the basis of the present number of bearing trees it has the smallest percentage of young non-bearing trees now planted of any of the important plum and prune producing counties (Table 5). Yakima county ranks second, producing almost three-fourths as many plums and prunes as Clark County with a little less than one-fourth as many bearing trees. Furthermore, there are over one-fifth as many non-bearing trees as bearing trees in Yakima county, while in Clark county the

Table 5. Important Plum and Prune Producing Counties of the State of Washington (1940)

County	Number of Trees		Pounds harv. 1939
	Non-Bearing	Bearing	
Clark	3,477	582,538	21,388,177
Yakima	29,048	136,580	14,739,947
Walla W.	6,716	35,849	3,526,075
Benton	25,150	16,530	1,562,095

non-bearing trees are less than 1 per cent of the number of bearing trees.

Walla Walla county ranks third in plum and prune production and Benton County is fourth. Of the important plum and prune producing counties, Benton county has made the heaviest planting of young trees, having about 9,000 more non-bearing trees than it has bearing trees (Table 5). Other counties, each annually producing from 700,000 to 250,000 pounds of prunes, are Okanogan, Chelan, Snohomish, Spokane, Whatcom, Lewis, and King.

Canned prunes. The canned prune pack is the second largest fruit pack in the Pacific Northwest. In 1940, however, because of a poor crop, it was only about half that of 1939; that is, about 1,160,000 cases; in 1941, the pack of prunes in Oregon and Washington totalled about 2,000,000 cases. Of the 1940 Northwest prune pack, 536,009 cases were canned in Washington. The Northwest canned prune is of the Italian variety, which is more tart than California prunes. Because the Italian is not grown commercially in other districts, the Pacific Northwest has a monopoly on this item.

Frozen prunes. In 1941, Washington and Oregon had a combined production of frozen prunes, largely pitted, amounting to 337,648

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Table 6. Important Cherry Producing Counties of the State of Washington (1940)

County	Number of Trees				Pounds harv. 1939	
	Sour		Sweet		Sour	Sweet
	Non-Bearing	Bearing	Non-Bearing	Bearing		
Yakima	258	5,838	19,684	143,852	277,689	12,912,575
Chelan	325	581	20,344	42,666	31,487	6,826,661
King	6,810	91,804	3,159	13,470	3,780,835	392,476
Benton	132	1,807	4,471	48,970	110,517	1,932,143
Pierce	2,565	37,887	1,137	8,934	1,541,867	296,940
Okanogan	39	1,060	1,252	7,502	57,685	1,116,814
Asotin	161	873	1,478	19,468	95,606	1,045,286
Douglas	211	153	3,708	9,737	16,015	1,283,094
Whatcom	796	12,078	982	12,806	413,272	265,736
Snohomish	1,060	14,810	1,988	14,281	350,379	388,307

pounds, but in 1942 the total of frozen pitted and unpitted p r u n e s greatly increased to 2,711,440 pounds.

Dried prunes. In 1939 the dried prunes of the Pacific Northwest totalled 28,400 tons, but in 1941 heavy rains reduced the crop and canners took much of the available fruit, and only 6,410 tons of dried prunes were packed here.

Plumcots. The p l u m c o t is a hybrid reported to result from a cross between *Prunus armeniaca* (apricot) and *P. salicina* (Japanese plum). In 1940 there were 12 non-bearing and 471 bearing plumcot trees in Washington, which produced 32,780 pounds of fruit.

The Cherry Industry of Washington

The trend in total production of cherries in Washington has shown a gradual increase from about 1909 up to about 1934. Since then the industry in the state has been just about maintained. In 1942 Washington produced 31,700 tons of cherries out of 199,840 tons produced in the United States. Of this total for 1942, about 25,900 tons of sweet cherries were produced in Washington, and 90,360 tons in the United States; Washington produced 5,800 tons of the 109,480 tons of sour cherries produced in this country. The most important sweet cherry producing counties are Yakima, Chelan, Benton, Douglas, Asotin, and Okanogan, all east of the Cascade Mountains. Of these, Yakima county is by far the most important, producing in 1939 about one-third of the total sweet cherry crop of the state, but Chelan has the highest proportion of non-bearing sweet cherry trees of any county (Table 6). Other counties that grow considerable quantities of sweet cherries are King, Snohomish, Pierce, Whatcom and Skagit, all in Western Washington.

King county produces the largest quantity of sour cherries, and in 1939 (Table 6) yielded approximately one-half of the sour cherry crop of the state. Pierce County ranks second, followed by Whatcom and Snohomish, all in Western Washington. In Eastern Washington, Yakima county ranks first in sour cherry production, followed by Benton county, although the latter county is exceeded by Skagit county west of the Cascades.

Canned cherries. A short crop in California in 1940 increased the interest of the Pacific Northwest in canning cherries. Hence, a good proportion of the Napoleon (Royal Anne) crop went to the canners instead of being brined. In 1942 the number of cases of cherries canned in Washington was as follows: (a) sour red varieties, 49,524; (b) Napoleon (Royal Anne), 224,536, and (c) sweet black varieties, 91,656, for a total of 365,716 cases.

Brined cherries. Most of the brined cherries of the Pacific Northwest are Napoleon (Royal Anne), and in 1941 about 54,016 barrels of 250 pounds each of this variety, 5,232 of Bing, 7,981 of Lambert, 5,778 of Republican, and 2,776 of miscellaneous varieties were so treated, giving a total of 75,773 barrels.

Frozen cherries. Most of the cherries used in freezing are the red, sour varieties. In Washington-Oregon the total frozen pack of cherries in 1940 was 2,481,932 pounds; in 1941 it was 1,970,003 pounds, and in 1942 it was 2,091,966 pounds. In 1940 the total consisted of 2,393,980 pounds of the sour cherries and 87,952 pounds of sweet cherries; in 1941 it was 1,490,699 and 539,304 pounds, respectively.

The Apricot Industry in Washington

The apricot acreage and production has shown a fairly consistent increase in Wash-

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ington from about 1909, and the state in 1942 produced 17,100 tons of the United States total of 233,200 tons. The four principal apricot growing counties (Table 7) are Yakima, Chelan, Douglas, and Benton; other important counties are Whitman, Grant, Asotin, and Garfield. All of the more important districts are east of the Cascade Mountains.

Table 7. Important Apricot Producing Counties of the State of Washington (1940)

County	Number of Trees		Pounds harv. 1939
	Non-Bearing	Bearing	
Yakima	15,484	133,343	11,652,957
Chelan	8,555	77,024	6,768,847
Douglas	11,889	57,912	4,103,699
Benton	6,771	17,385	1,419,531

Canned apricots. The pack of canned apricots in Washington in 1940 was 84,708 cases of all sizes, but in 1941 it had increased considerably to 118,467 cases, following the trend which has been developing during recent years. The total canned apricot pack for the United States dropped, however, in 1942, reportedly as a result of the tin conservation order, but in Washington there was another important increase to 163,174 cases of all sizes.

Frozen apricots. Until very recently the pack of frozen apricots in Washington-Oregon had been relatively small (178,225 pounds in 1939) but in 1941 there was a considerable and important, rise to 403,218 pounds, and in 1942 to 1,846,536 pounds.

Fig Trees in Washington

The number of fig trees in Washington has been decreasing since 1929, because in most areas the winters are too cold. In 1940 there were 334 non-bearing and 563 bearing fig trees of all varieties, that produced in 1939 about 5,936 pounds of figs.

The Nut Industry of Washington

English walnuts. A few English walnuts are grown in Washington, and Clark is the principal producing county, followed by Skagmania, Cowlitz and Whatcom (Table 8). Other counties that produce six or seven thousand pounds annually are Snohomish,

Table 8. Counties Producing the Greater Quantities of English Walnuts (1940)

County	Number of Trees		Pounds harv. 1939
	Non-Bearing	Bearing	
Clark	2,736	19,220	319,926
Skamania	228	1,422	22,200
Cowlitz	716	1,178	13,295
Whatcom	629	819	11,160

Lewis, and Skagit. Whitman county is of interest in that, while there are only about 18 bearing trees in the county, it is reported to have about 1,600 trees of non-bearing age.

Filberts. Though the commercial culture of filberts was begun rather recently there has been a constant and considerable increase in both acreage and production since about 1929. In production, Clark county leads, followed by Whatcom, Lewis, Skagit, and Snohomish (Table 9). Other counties that annually produce from 12 to 18 thousand pounds of filberts are Cowlitz, King, Thurston, and Skamania.

Table 9. Counties Producing the Greater Quantities of Filberts and Hazelnuts (1940)

County	Number of Trees		Pounds harv. 1939
	Non-Bearing	Bearing	
Clark	36,067	91,457	578,918
Whatcom	5,778	15,225	74,782
Lewis	5,235	12,742	48,160
Skagit	2,083	6,668	26,553
Snohomish	7,864	7,180	21,653

Almonds. Washington was reported as having in 1940 about 533 non-bearing and 1,887 bearing almond trees, which in 1939 had produced 5,536 pounds of nuts. The number of almond trees in the state has been gradually decreasing since 1909, because their early blooming habit subjects them to damage from spring frost.

Chestnuts. About 3,089 non-bearing and 96 bearing chestnut trees were reported in Washington in 1940. These produced 4,150 pounds of nuts in 1939. The industry is of recent origin, but the total acreage and production has increased since 1929.

The Small Fruit and Grape Industry of Washington

Upon the basis of the pounds of fruit harvested in 1939 (Table 10, U. S. 16th Census, 1940), the rank in order of importance of small fruits and grapes in Washington, the first listed having the largest production, is as follows: (1) strawberries; (2) grapes; (3) blackberries and dewberries; (4) raspberries; (5) loganberries; (6) cranberries; (7) currants; (8) gooseberries; (9) Youngberries; (10) Boysenberries; and (11) blueberries.

Canned berries. In 1940, most berry crops in the Pacific Northwest, with the exception of strawberries, were somewhat below normal because of unfavorable growing conditions. In 1941 the canned berry pack of the Pacific

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To One Gallon Water
3 Tablespoonfuls
2 Teaspoonfuls

IN SPRING—Just before new growth starts.

Against certain **SCALE, RED SPIDER** and **APHIS** Spray with:

VOLCK Nursery & Garden Spray (1-50)
EXTRAX Insect Spray "400" (1-800)

5¼ Tablespoonfuls
1 Teaspoonful

IN SPRING—About 1 month after first spring application, Spray with:

VOLCK Nursery & Garden Spray 3 Tablespoonfuls

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Northwest remained at the relatively low level of 1940, probably because of the increase in grower prices resulting from higher production and harvesting costs.

The 1942 pack of canned berries in the West, exclusive of cranberries, totaled 652,320 cases compared with 700,862 cases in 1941.

Table 10. The Acreage and Production of Small Fruits and Grapes in the State of Washington (1940)

Fruit	Acreage	Pounds harv. 1939
Blackberries and Dewberries (tame)	1,550	11,955,849
Boysenberries	185	260,394
Cranberries	297	1,022,187
Currants	187	602,650
Gooseberries	142	517,060
Grapes	1,496,941 (vines)	12,579,840
Loganberries	678	1,834,293
Raspberries (tame)	3,680	10,511,849
Black	647	1,471,413
Red	3,043	9,040,436
Strawberries	6,653	20,543,083
Youngberries	163	300,047

The Strawberry Industry of Washington

The total acreage and production of strawberries in the state did not show consistent change from 1929 to 1939. The more important strawberry producing counties, each producing annually from 2.6 to 1.8 million pounds, are Kitsap, Skagit, Whatcom, Clark, and King (Table 11). Other counties annually producing from 1.3 to 1.0 million pounds of strawberries are Thurston, Snohomish, Pierce, and Spokane.

Table 11. Important Strawberry Producing Counties of the State of Washington (1940)

	Acreage	Pounds harv. 1939
Kitsap	584	2,645,818
Skagit	554	2,424,983
Whatcom	535	1,989,590
Clark	640	1,924,785
King	427	1,834,988

Frozen strawberries. In 1942 Washington-Oregon packed about 35.5 million pounds of frozen strawberries out of a total pack for the United States amounting to about 63.0 million pounds.

The Grape Industry of Washington

The bearing acreage and production of grapes in the state did not show much change between 1929 and 1939, but the nonbearing acreage in 1939 was larger than had been

reported in earlier years. Hence, production during the next few years can be expected to show an increase. In 1942 the state produced 14,900 tons of the total United States production of 2.5 million tons. The most important grape producing county in Washington is Yakima, which harvested over one-half the grape crop in 1939. Yakima is followed in order of amount annually produced by Benton, Franklin, King and Walla Walla counties (Table 12). Other counties that annually produce from 110,000 to nearly 170,000 pounds of grapes are Chelan (110,000), Klickitat, Clark and Mason (167,000). Benton, Walla Walla, and Franklin counties all have large nonbearing acreages in proportion to the bearing acreage, and Yakima county has nearly half as many nonbearing as bearing vines. Hence, all of these counties should show considerable increase in production during the next few years.

Table 12. Important Grape Producing Counties of the State of Washington (1940)

County	Number of Vines		Pounds harv. 1939
	Non-Bearing	Bearing	
Yakima	222,633	512,526	7,810,296
Benton	159,624	167,378	2,585,829
Franklin	35,350	48,750	631,455
King	8,272	50,252	255,727
Walla Walla....	13,111	16,563	206,935

Grape juice and wine. Figures are not available for Washington as to the production of grape juice. During recent years, increasing quantities of Concord grape juice have been bottled in the Kennewick area. The Pacific Coast pack in 1941 was approximately 300,000 cases. Wine has been made from grapes in considerable quantity in the Sunnyside district and elsewhere in the state.

The Blackberry and Dewberry Industry in Washington

As shown in Table 10, there were 1,550 acres of blackberries and dewberries in Washington in 1940, and in 1939 about 11,955,849 pounds of fruit were harvested. The most important county is Pierce, which in the latter year harvested 9,147,824 pounds of blackberries and dewberries. King county, which produced 1,847,401 pounds, is next in line. Skagit and Snohomish are also relatively important, producing in 1929 about 405,825 and 387,685 pounds, respectively.

The Evergreen blackberry, Logan, Young

Boysen and Olympic berries in 1939 occupied most of the acreage of such fruits in Western Washington and supplied most of the crop. The first-named sort, upon the basis of fruit harvested, is by far the most important variety of this group.

Canned blackberries. Washington in 1941 canned 159,862 cases of blackberries.

Frozen blackberries. This is nearly a Northwest monopoly, as all but 1,024,644 pounds of the United States total of 9,683,375 pounds was packed in Washington-Oregon in 1942. Most of the output is from the State of Washington, although some tonnage comes from Oregon and California.

The Raspberry Industry of Washington
Of the raspberries, the red ones are more important than the black types (Table 10). The industry as measured by bearing and nonbearing acreage and production was

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somewhat larger in 1929 than is now the case. The decrease resulted from serious losses from winter injury and diseases of the principal red raspberry variety, the Cuthbert, and also from low prices received by growers for the fruit during the depression period. The development of the improved varieties—Washington and Tahoma⁴—as well as the better prices received for the fruit the last few years, have stimulated new plantings.

Red Raspberries. Pierce is the most important red raspberry producing county in Washington, and in 1939 5,512,723 pounds were harvested from 1,574 acres. King county is also important, producing from 427 acres, 1,221,959 pounds of these beautiful fruits in 1939. Spokane is the leading county in eastern Washington having produced in 1939

4. The Washington and Tahoma Red Raspberries, by C. D. Schwartz, Wash. Agr. Exp. Sta. Pop. Bul. No. 153:1-11. 1938.


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about 715,584 pounds. Other counties that annually yield from 340 to 230 thousand pounds are Snohomish, Thurston and Clark. In 1941 the pack of canned red raspberries was 45,316 cases, while the Washington-Oregon pack of frozen berries of this type in the following year was 14,180,796 pounds.

Black raspberries. Pierce county also grows more black raspberries than any other county of the state, with a total 1939 yield of about 670,333 pounds from 108 acres; Thurston produced 290,492 pounds from 308 acres; and King, 183,865 pounds from 72 acres. The Washington-Oregon pack of canned black raspberries in 1941 was 24,184 cases; and in 1942 of frozen 3,726,516 pounds.

Loganberries. Since 1929 both the acreage and production of Loganberries have declined in Washington. Pierce county ranks first in Loganberries, producing 781,981 pounds in 1939 from 233 acres; next in rank is King county with 587,893 pounds from 209 acres. Mason and Thurston produced 131,090 and 72,691 pounds, respectively, in 1939. In Washington in 1941 the pack of canned Loganberries was 10,389 cases. The Washington-Oregon pack of frozen Loganberries the same year was 2,992,567 pounds, of a total of 3,464,567 pounds for the United States.

Cranberries. Because they require special soils and climate, the commercial growing of cranberries is more definitely restricted than nearly any other fruit in Washington. The two counties growing the commercial crop are Pacific, which produced 694,196 pounds from 233 acres and Grays Harbor, producing 320,745 pounds from 60 acres in 1939. In 1942 the total crop in these counties was 2,300,000 pounds. The cranberry industry is at present expanding in each of these counties with less than one-fifth of the estimated available land now in use. A few bogs are located in other western Washington counties and it is likely that some land suitable for cranberry culture may be found in several of these.

In 1924 many small tracts were planted in the Graylands section of Pacific and Grays Harbor counties. Since that time there has been a gradual increase in the planted acreage there and upon the Long Beach peninsula. Good clean bogs in production often sell for as much as \$2,000.00 per acre, and returns

from them appear frequently to justify such prices. The estimated value of the 1943 cranberry crop of western Washington is between five and six hundred thousand dollars.

The most important variety now grown in this section is the McFarlin which produces about three-fourths of the Washington crop. Good bogs of the McFarlin have often yielded more than 10 tons of berries per acre, but the average approximates 2.5 tons. The thin tender skin of this variety makes it popular for making "whole cranberry sauce," though the color of the fruit is somewhat less attractive than that of certain competitive varieties. The trailing habit of growth of the vines necessitates harvesting the fruit by hand picking. This not only increases the cost, in contrast with harvesting by scooping, but also makes the operation very difficult in view of the present labor shortage. The Cranberry-Blueberry Laboratory at Long Beach and the Division of Horticulture of the State College of Washington, have undertaken a cooperative project to develop a new cranberry variety which will retain the good qualities of the McFarlin and eliminate its faults.

Cranberries are largely canned as a sauce, mostly in eastern states, but a growing pack is being made in Washington. The fruits were originally canned by a western cooperative, which has now become affiliated with a Massachusetts growers' association.

Currants. The acreage and production of currants in Washington has not changed significantly during the years from 1929 to 1939. As shown in Table 10, in the last-named year the state produced 602,750 pounds of currants from 187 acres. King county produces nearly the entire crop and in 1939, 540,288 pounds were harvested from 160 acres. Spokane county ranks second, producing 32,690 pounds from 10 acres; followed by Snohomish with 18,342 pounds from 7 acres; then Pierce with 4,783 from 4 acres. In 1942 the frozen pack of currants in Washington-Oregon totaled 662,250 pounds.

Gooseberries. The production and acreage of gooseberries decreased slightly during the years from 1929 to 1939. The total production for the state in 1939 was 517,060 pounds from 142 acres. Of this quantity, 242,826 pounds were harvested from 78 acres in King county; 63,665 pounds from 19 acres in

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Thurston; and 20,035 from 6 acres in Pierce county. The pack of canned gooseberries in Washington for 1941 was 6,103 cases. In 1942, the frozen pack of these fruits in Washington-Oregon was 629,510 pounds.

Youngberries. This industry has developed during recent years and the state produced 300,047 pounds of Youngberries from 163 acres in 1939. The principal county was Clark, where 102,608 pounds were harvested from 39 acres; followed by Pierce with 49,736 pounds from 21 acres; Thurston with 42,557 pounds from 33 acres; and King county with 33,217 pounds from 19 acres.

Boysenberries. The Boysenberry industry has also developed during the past few years. In 1939 about 260,394 pounds were harvested in Washington from 185 acres (Table 10). King county contributed 69,821 pounds from 46 acres; Pierce, 49,330 from 27 acres; Clark, 25,796 from 17 acres; Skagit, 23,435 from 12 acres, and Spokane county, 12,420 pounds from 7 acres.

Blueberries. The first planting of cultivated blueberries in Washington was made

near Long Beach in 1916 or 1917 by Henry F. Gane. He obtained the plants from Dr. F. V. Colville, who did much of the pioneering work in blueberry culture.

Blueberries in Washington are often incorrectly called huckleberries. There are no huckleberries growing commercially here. The fruit of the blueberry is the better of the two. The Washington-Oregon pack of frozen blueberries in 1941 was 568,375 pounds, most of which were from native species. A considerable quantity also is harvested from the native wild plants and marketed as fresh fruit.

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